twentieth anniversary Macintosh

User's Manual

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User's Manual

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Communications regulation information

The following FCC information applies only to Twentieth Anniversary Macintosh computers sold in Canada, Japan, and the United States.

FCC declaration of conformity

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. See instructions if interference to radio or television reception is suspected.

Telephone Consumer Protection Act

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device to send any message via a telephone fax machine unless such message clearly contains in a margin at the top or bottom of each transmitted page, or on the first page of the transmission, the date and time it was sent and an identification of the business or other entity, or individual sending the message, and the telephone number of the sending machine of such business, entity, or individual. For instructions for providing this information with each fax you send, refer to the user's manual that came with your software.

Radio and television interference

The equipment described in this manual generates, uses, and can radiate radio-frequency energy. If it is not installed and used properly—that is, in strict accordance with Apple's instructions—it may cause interference with radio and television reception.

This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in Part 15 of FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

You can determine whether your computer system is causing interference by turning it off. If the interference stops, it was probably caused by the computer or one of the peripheral devices.

If your computer system does cause interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the computer to one side or the other of the television or radio.
- Move the computer farther away from the television or radio.
- Plug the computer into an outlet that is on a different circuit from the television or radio. (That is, make certain the computer and the television or radio are on circuits controlled by different circuit breakers or fuses.)

If necessary, consult an Apple-authorized service provider or Apple. See the service and support information that came with your Apple product. Or, consult an experienced radio/television technician for additional suggestions.

Important Changes or modifications to this product not authorized by Apple Computer, Inc., could void the FCC Certification and negate your authority to operate the product.

This product was tested for FCC compliance under conditions that included the use of Apple peripheral devices and Apple shielded cables and connectors between system components. It is important that you use Apple peripheral devices and shielded cables and connectors between system components to reduce the possibility of causing interference to radios, television sets, and other electronic devices. You can obtain Apple peripheral devices and the proper shielded cables and connectors through an Apple-authorized dealer. For non-Apple peripheral devices, contact the manufacturer or dealer for assistance.

Responsible party: Robert Steinfeld, Apple Computer, Inc., 1 Infinite Loop, Cupertino, CA 95014-2084, 408-974-2618.

Industry Canada statement

This Class B device meets all requirements of the Canadian interference-causing equipment regulations.

Cet appareil numérique de la Class B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

VCCI Class 2 statement

情報処理装置等電波障害自主規制について

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づく第二種情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをしてください。

Information you need in the United States

The GeoPort Telecom Adapter and the GeoPort Internal Modem comply with Part 68 of the FCC rules. On the back of this equipment is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN). If requested, provide this information to your telephone company.

- *Ringer equivalence number (REN):* 0.8B

  The REN is useful for determining the number of devices you may connect to your telephone line and still have all devices ring when your telephone number is called. In most, but not all, areas the sum of the RENs of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area.

- *Telephone jack type:* USOC, RJ-11

  An FCC-compliant telephone cord and modular plug are provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack that complies with Part 68 rules. See the installation instructions for details.

Telephone line problems

If your telephone doesn't work, there may be a problem with your telephone line. Disconnect the modem to see if the problem goes away. If it doesn't, report the problem either to your local telephone company or to your company's telecommunications people.

If disconnecting the modem eliminates the problem, the modem itself may need service. See the service and support information that came with your Apple product for instructions on how to contact Apple or an Apple-authorized service provider for assistance.

If you do not disconnect your modem when it is adversely affecting the telephone line, the telephone company has the right to disconnect your service temporarily until you correct the problem. The telephone company will notify you as soon as possible. Also, you will be informed of your right to file a complaint with the FCC.

The telephone company may make changes to its facilities, equipment, operations, or procedures that could affect the operation of your equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications to maintain uninterrupted service.

The GeoPort Telecom Adapter and the GeoPort Internal Modem will not work with party lines, cannot be connected to a coin-operated telephone, and may not work with a private branch exchange (PBX).

Information you need in Canada

The Canadian Department of Communications (DOC) label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Department does not guarantee the equipment will operate to a user's satisfaction.

Before installing this equipment, make sure that you are permitted to connect to the facilities of the local telecommunications company. Be sure you use an acceptable method of connection to install the equipment. In some cases, you may extend the company's internal wiring for single-line individual service by means of a certified telephone extension cord. Be aware, however, that compliance with these conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any equipment malfunctions or repairs or alterations that you make to this equipment may cause the telecommunications company to request that you disconnect the equipment.

In Canada, contact Apple at:
7495 Birchmount Road, Markham, Ontario
L3R 5G2, 800-263-3394

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Warning Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority or electrician.

- *Load number:* 15

  The load number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to the telephone loop that is used by the device, to prevent overloading. The termination of a loop may consist of any combination of devices, subject only to the requirement that the sum of the load numbers of all devices does not exceed 100.

- *Telephone jack type:* CA-11

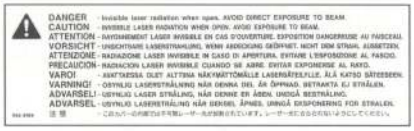
Laser information

Warning Making adjustments or performing procedures other than those specified in your equipment's manual may result in hazardous exposure.

Warning Do not attempt to disassemble the cabinet containing the laser. The laser beam used in this product is harmful to the eyes. The use of optical instruments, such as magnifying lenses, with this product increases the potential hazard to your eyes. For your safety, have this equipment serviced only by an Apple-authorized service provider.

If you have an internal Apple CD-ROM drive in your computer, your computer is a Class 1 laser product. The Class 1 label, located in a user-accessible area, indicates that the drive meets minimum safety requirements. A service warning label is located in a service-accessible area. The labels on your product may differ slightly from the ones shown here.

Class 1 label



Service warning label

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Simultaneously published in the United States and Canada.

Preface

Dear Twentieth Anniversary Macintosh customer,

For twenty years, Apple design engineers have been building bridges between what people dream about and the amazing new technologies that can take them beyond those dreams.

It's our magnificent obsession.

It's about working and playing and listening and learning and creating and communicating—sometimes all at the same time.

It's about the delight of doing things faster and better and easier.

It's about the joy of holding and handling and using things that are well made.

It's about turning your back on conventional wisdom and finding new ways.

Now, it's about celebrating the last twenty years, and heralding the next twenty.

It's about the most wonderful thing we've ever built.

It's the Twentieth Anniversary Macintosh.

Sincerely,

Gil Amelio

Dr. Gil Amelio
CEO Apple Computer, Inc.

Where to find answers

When you have questions about using your Macintosh, there are several places you can look for answers.

Apple Guide

If you need help or experience a problem while using the computer, open the Guide (?) menu and choose Mac OS Guide. The Guide menu is the main source for information while you are using the computer.

Macintosh user's manual

Use this book to help you set up your computer and learn about it, or to find solutions to problems.

Other manuals

For answers to questions about other equipment or about application programs you have purchased, see the manuals that came with the equipment or programs.

Apple's customer support hotline

If you can't find an answer in any of the materials provided, call the customer support hotline. (The phone number for the hotline is in the service and support information that came with your computer.)

Part One

Getting Started

Chapter One

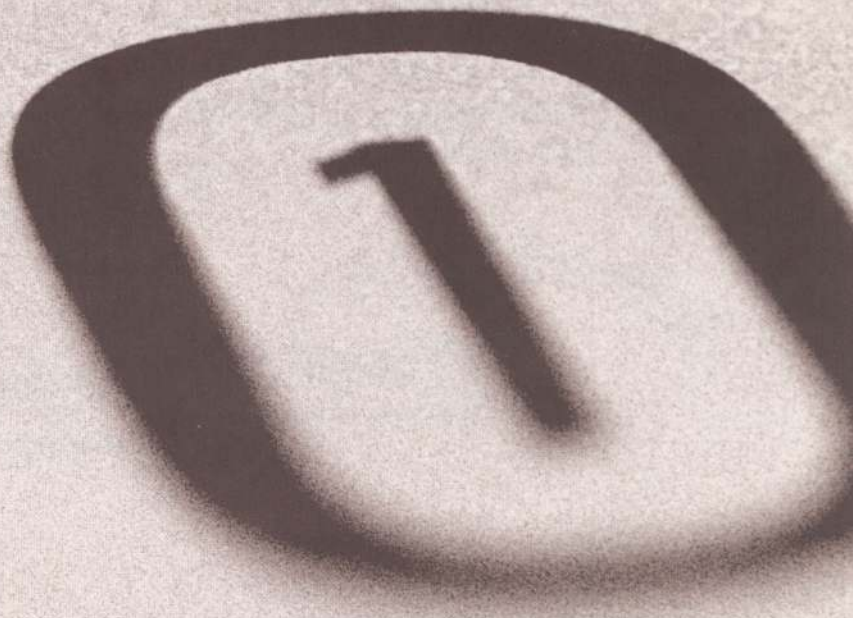
Setting Up 2

Chapter Two

Learning to Use Your Computer 30

Chapter Three

Using Software 40



Setting Up

The illustration below and on the next page shows all the equipment you received with your computer, including everything you'll need to set up your computer and begin using it.

Before following the setup instructions in this chapter, you may want to read "Arranging Your Office" in Appendix A (in the section on health-related information) for tips on adjusting your work furniture so that you're comfortable when using the computer.

You will follow these general steps in setting up your equipment:

- Unpacking the equipment
- Connecting the bass unit to the computer
- Plugging in the power cord
- Connecting the keyboard
- Connecting the GeoPort Telecom Adapter (for the modem)
- Turning on the computer

Expansion back cover

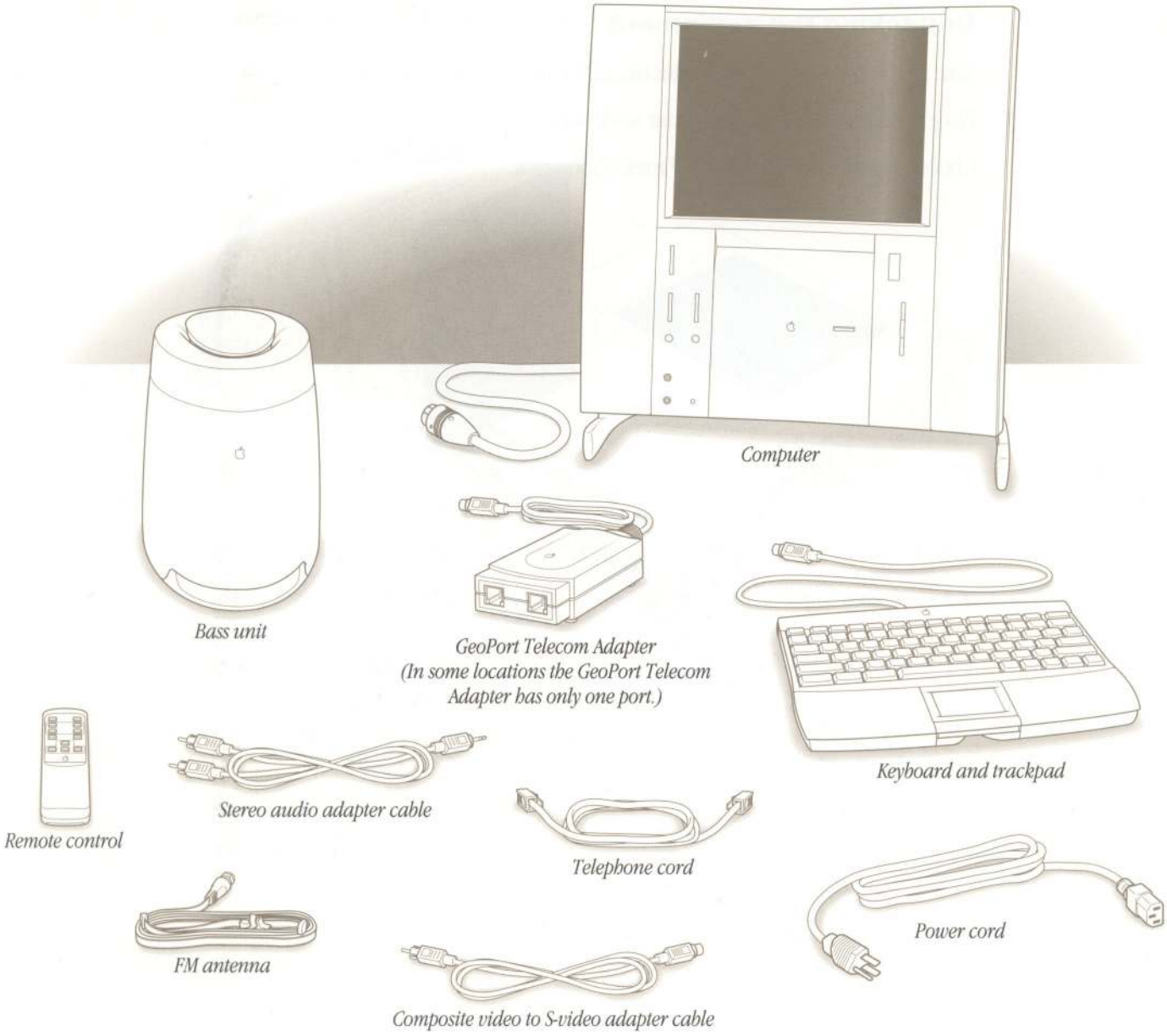
Batteries

PCI card adapter

Mono audio adapter cable

Communication card adapter

Expansion panel


Computer
Bass unit
GeoPort Telecom Adapter
(In some locations the GeoPort Telecom Adapter has only one port.)
Keyboard and trackpad
Remote control
Stereo audio adapter cable
Telephone cord
Power cord
FM antenna
Composite video to S-video adapter cable

Unpacking the equipment

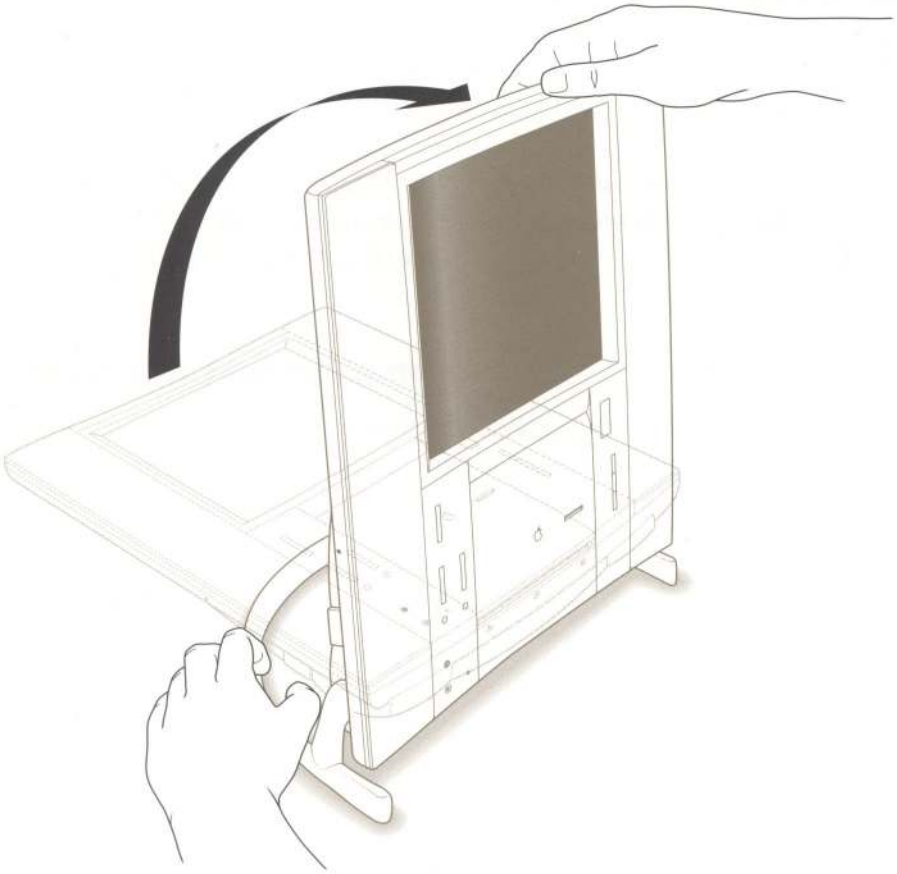
Take all the parts of your computer out of the boxes. Then follow these instructions:

1 Place the computer face-up on your work surface.

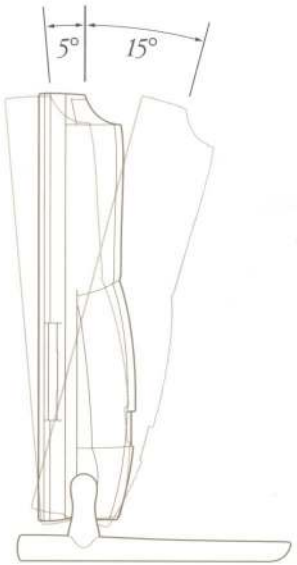
Choose a sturdy, flat surface near a telephone jack.

Place the computer on a flat, clean, stable surface.

2 While holding the computer's base firmly, raise the computer to a comfortable viewing position.



The screen should be vertical, tilted back by no more than a 15-degree angle, or tilted forward by no more than a 5-degree angle (to ensure that the CD-ROM drive operates correctly).



Positioning the bass unit

Place the bass unit near a grounded outlet, within six feet of the computer. The bass unit is designed to be placed under your work surface and will perform best acoustically when placed on the floor. It can also be placed on any stable, flat surface. For proper cooling, be sure that the air flow around the bass unit is not restricted.

Important The bass unit contains a very strong magnet. To prevent the magnet from interfering with the computer's operation, do not place the bass unit next to the computer. Do not place floppy disks on top of the bass unit (data may be lost).

Plugging in your equipment

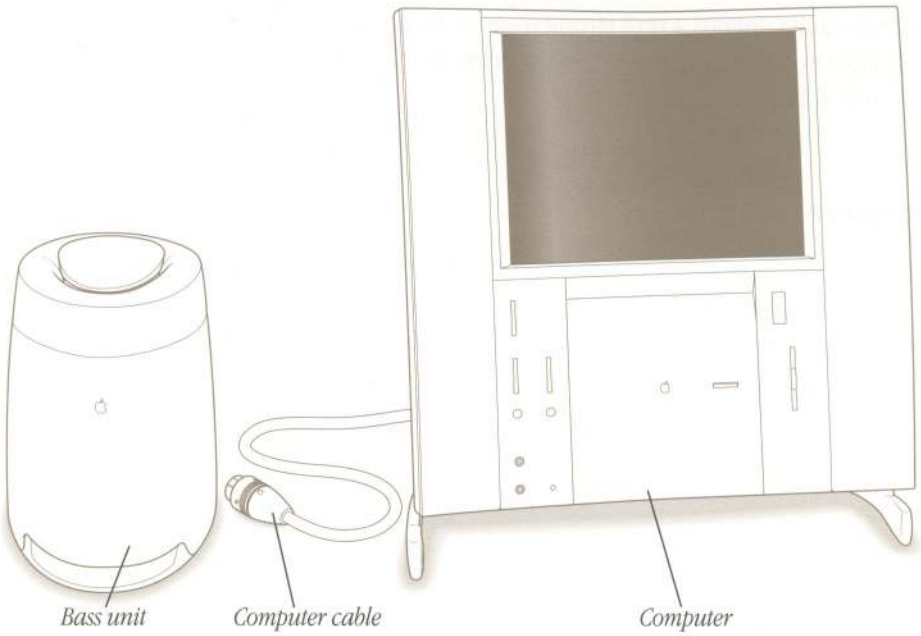
Before you plug your equipment into a wall socket, carefully read all the setup instructions in this chapter. Then, before you connect anything to your computer, follow the instructions in this section to plug it in. The plug grounds the computer and protects it from electrical damage while you are setting up.

Attaching the bass unit to the computer

Follow these steps to attach the bass unit to the computer:

1 Locate the large cable attached to the computer.

This cable plugs into the bass unit.

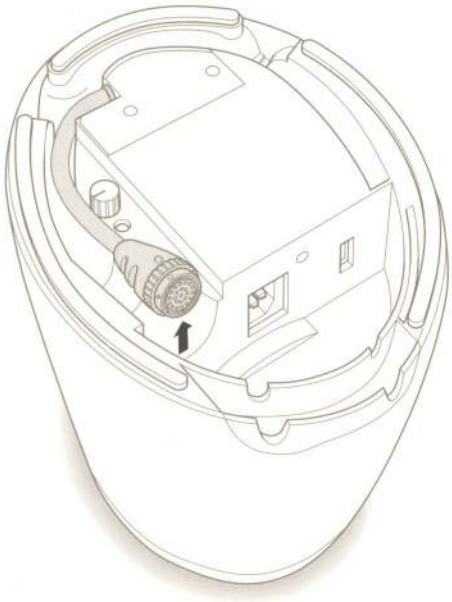


2 Turn the bass unit upside down.

Locate the recessed well on the underside of the bass unit, and the groove containing a short cable already attached to the bass unit.

Note: The recessed well also contains the bass unit's level control. The control is preset at the level that is appropriate for most conditions, so don't change the setting now. Note the location of the control in case you want to adjust it after you start up the computer. (Chapter 7 explains how to adjust the speakers and bass unit.)

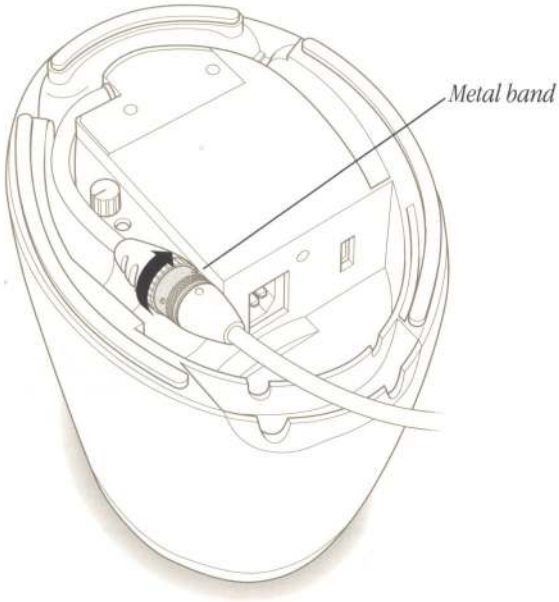
3 Pull up on the cable that is connected to the bass unit to release it from the groove where it has been stored.



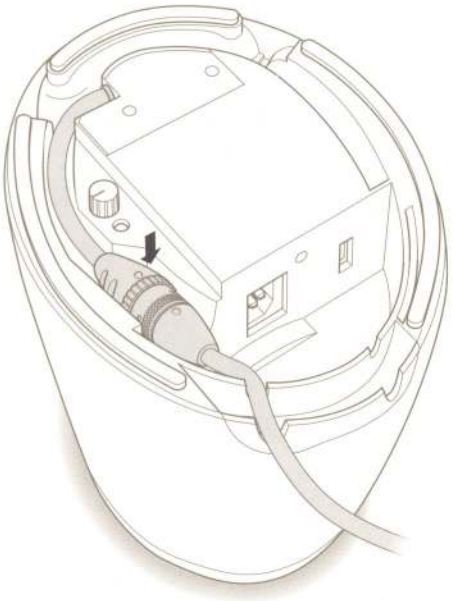
4 Plug the connector at the end of the computer's cable into the bass unit's connector.

Align the two connectors until the small internal ribs and grooves line up, and press the connectors together. Do not force the connectors.

5 Secure the connection by very firmly rotating the metal band until you hear a click.



6 Press the cable back into the groove and route the computer cable through the cutouts in the base of the bass unit.



Plugging in the power cord

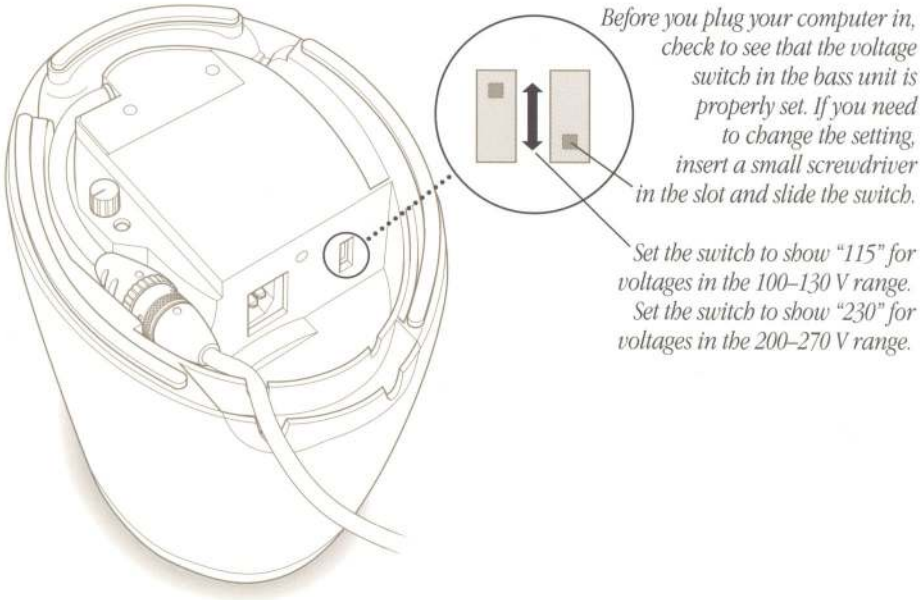
Follow these steps to plug your equipment into a wall outlet:

1 Make sure the voltage switch inside the well on the bottom of the bass unit is set for the voltage you connect to.

The voltage switch is preset at the factory to the correct voltage for the area where you bought the computer.

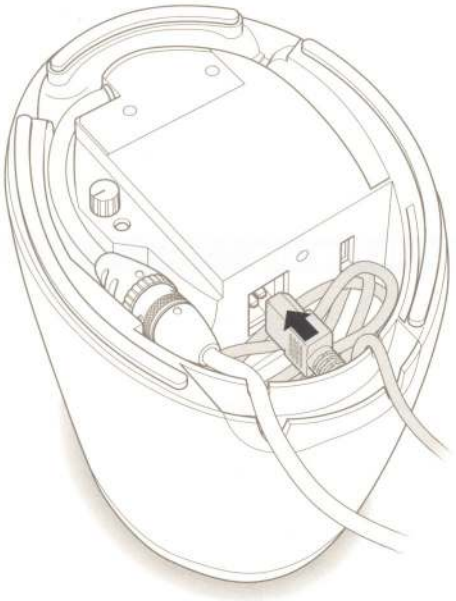
If there is any chance that the setting has been changed, or if you take the computer to a country with a different voltage system, it's important to check the voltage and change the setting if necessary. The voltage switch must be set correctly to avoid damaging your computer.

Country	Voltage switch setting
France, Germany, and United Kingdom	230
Japan and United States	115



2 Plug the socket end of the power cord firmly into the recessed power plug (marked with the symbol ~) inside the well on the bottom of the bass unit.

Route the cable through the cutouts in the base of the bass unit. You can store any extra length of the power cord in the well.



3 Plug the other end of the power cord into a three-hole grounded outlet or power strip.

▲ **Warning** This equipment is intended to be electrically grounded. Your computer is equipped with a three-wire grounding plug—a plug that has a third (grounding) pin. This plug will fit only a grounded AC outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet. Do not defeat the purpose of the grounding plug! ▲

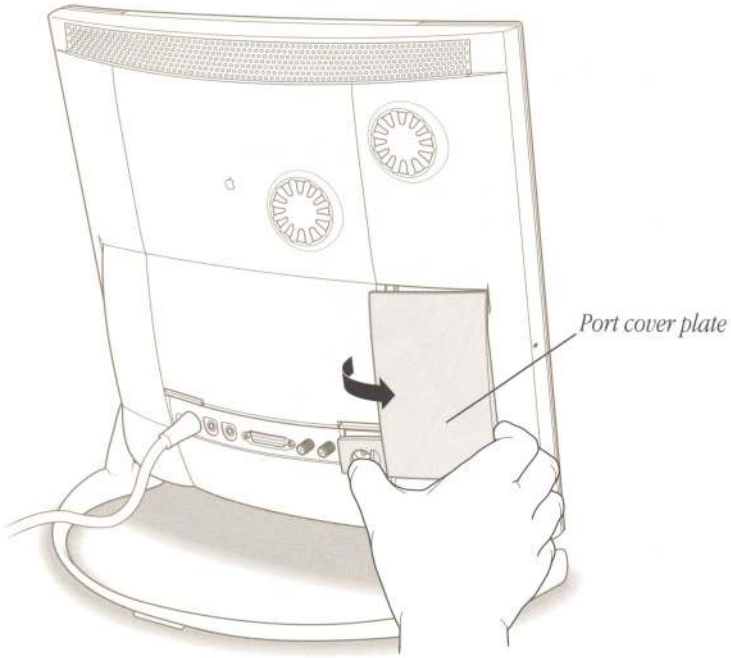
4 Turn the bass unit right-side up and position it where you want it.

Important The only way to disconnect power completely is to unplug the power cord. Make sure the power cord is within easy reach so that you can unplug the computer when you need to.

Removing the port cover plate

Before you can connect the keyboard and modem, you must remove the port cover plate. Follow these steps:

1 Squeeze the cover plate between your fingers and swing it away from the computer.



2 Set the cover plate aside. (The cover plate is made up of two sections that can be easily separated and reassembled if needed.)

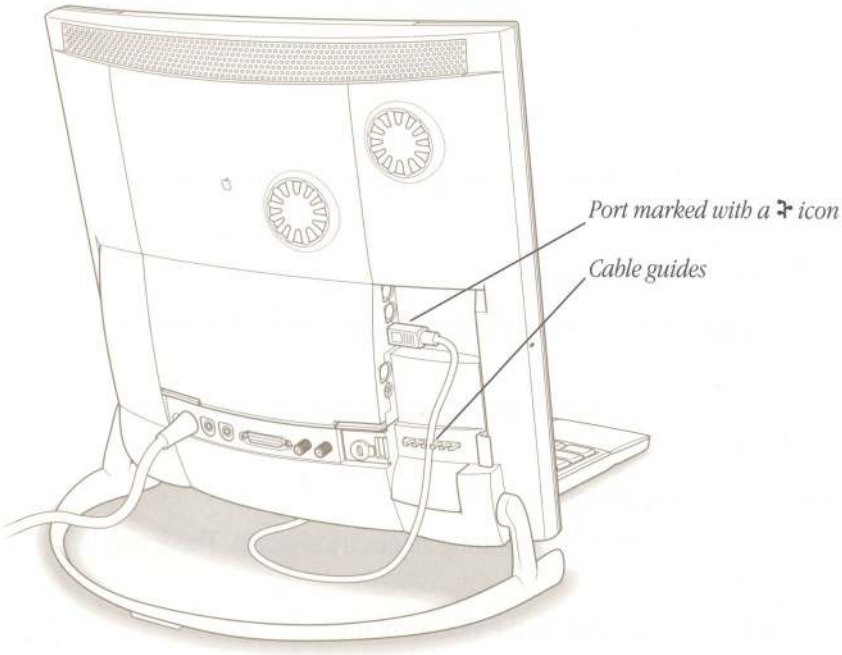
The port cover plate covers the ports for the modem, keyboard, printer, and video equipment (such as a video cassette recorder or camcorder). For now you'll just connect the keyboard and modem.

Connecting the keyboard

To connect the keyboard to the back of your computer, follow these steps:

1. Pass the keyboard cable under the computer.
2. Plug the keyboard cable into the port marked with the ⌁ icon on the back of the computer, and press the cable into the cable guides.

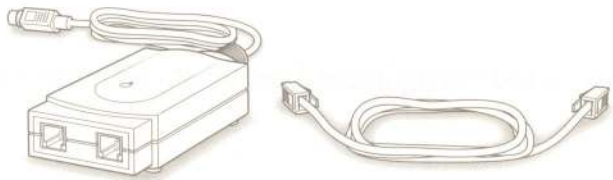
   Be sure to use the correct port, which is marked with the ⌁ icon. Don't use any other port, even if the cable seems to fit.



By the way: A port marked with the ⌁ icon is called an *Apple Desktop Bus (ADB)* port.

Connecting your modem to a telephone jack

The GeoPort Telecom Adapter that came with your computer lets you connect your computer's high-speed Express modem to a telephone jack so you can send electronic mail (e-mail) and fax messages, and connect to the Internet.



GeoPort Telecom Adapter (In some locations the GeoPort Telecom Adapter has only one port.)

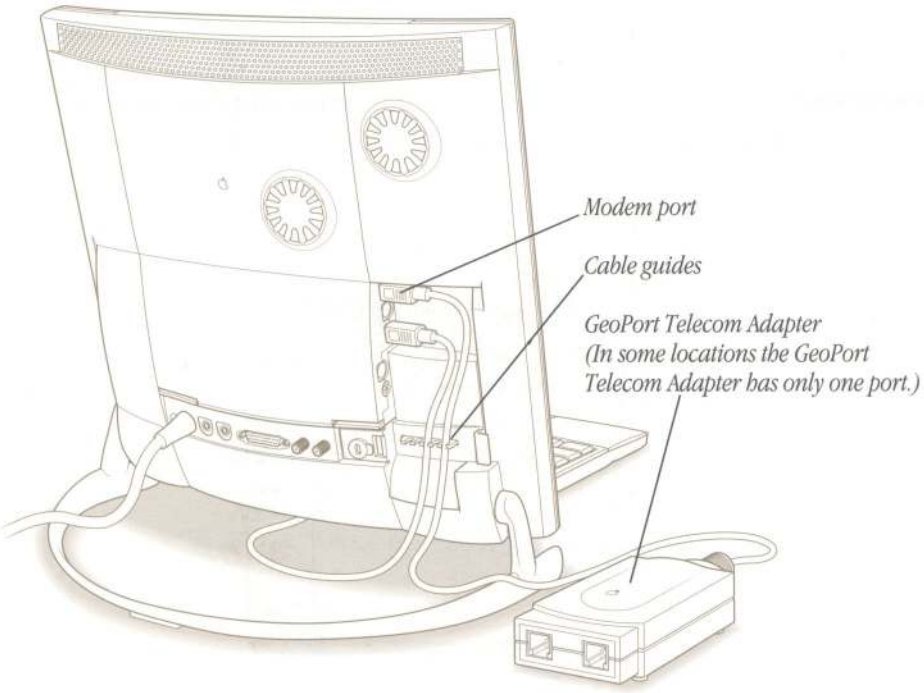
Telephone cord

Important If you're planning to install telephone wiring or telephone jacks, follow these precautions:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jacks are specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using a telephone, other than a cordless type, during an electrical storm. There may be a remote risk of shock from lightning.
- Never use a telephone to report a gas leak while in the vicinity of the leak.

To connect your modem to a telephone jack, follow these instructions:

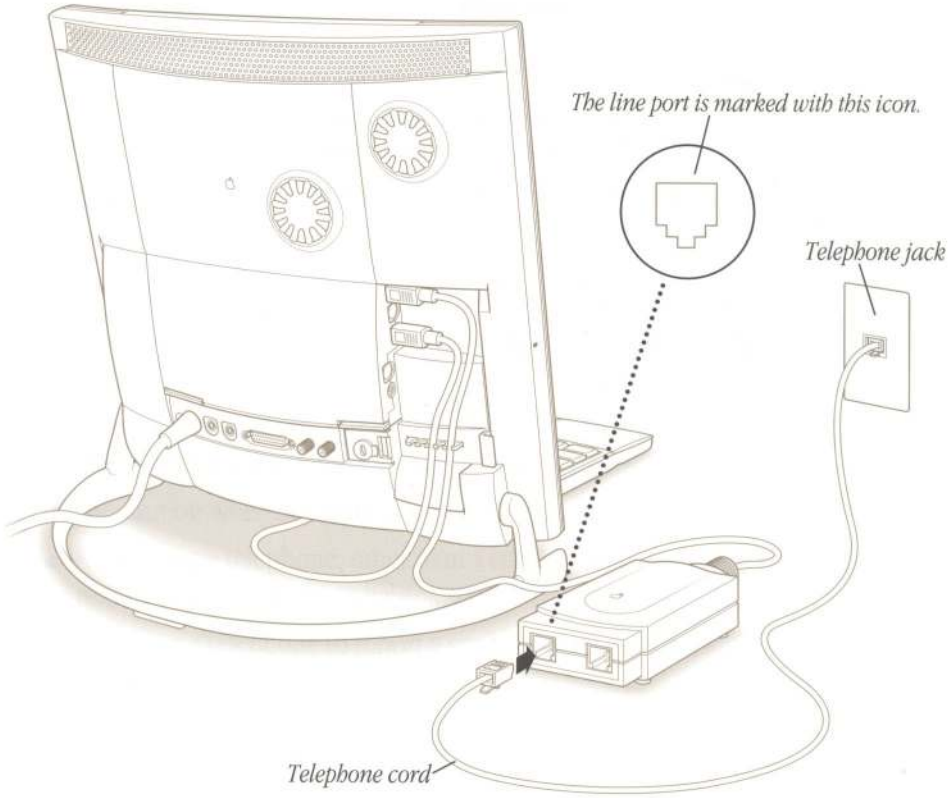
1 Plug the GeoPort Telecom Adapter's cable into the computer's modem port (), and press the cable into the cable guides.



2 Plug one end of the adapter's telephone cord into a telephone jack. Plug the other end into the line port on the adapter.

If a telephone is plugged into the jack you want to use, unplug the telephone's cord from the jack.

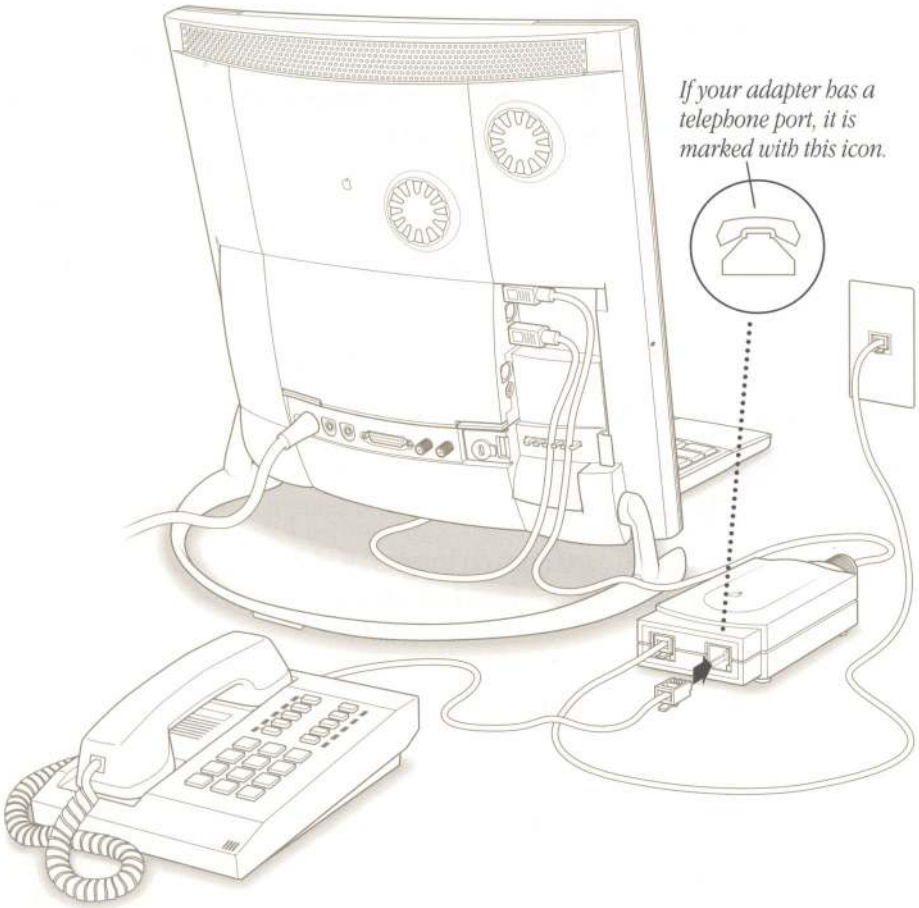
Important When connecting a modem, make sure you connect the modem to an analog phone line—the kind used typically in homes. Connecting to a PBX or ISDN line could damage the modem. If you want to connect the computer to an ISDN line, follow the instructions that came with your ISDN equipment. See Chapter 4, "Connecting Your Computer to a Telephone Line," for more information.



Note: If your GeoPort Telecom Adapter has only one port, skip step 3.

3 If you want to have your telephone use the same jack as the adapter, plug your telephone's cord into the telephone port on the back of the adapter (marked with the ☎ icon).

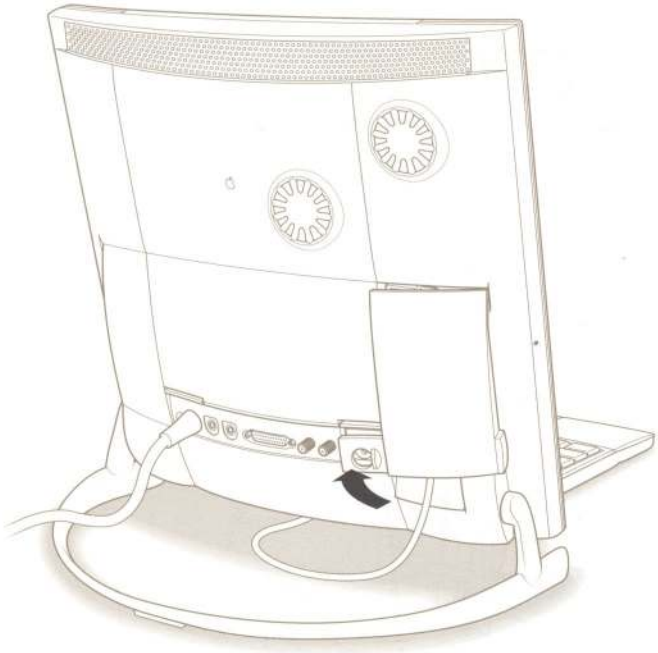
If you don't want your computer and telephone to share a jack, skip this step.



Important During lightning storms, disconnect your modem from the telephone jack to prevent possible damage to the modem.

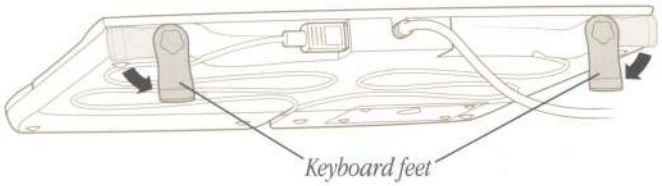
Replacing the port cover plate

Put the port cover plate back on.



Adjusting the keyboard (optional)

If you wish to adjust the angle of the keyboard, rotate the keyboard feet down.



Repositioning the trackpad (optional)

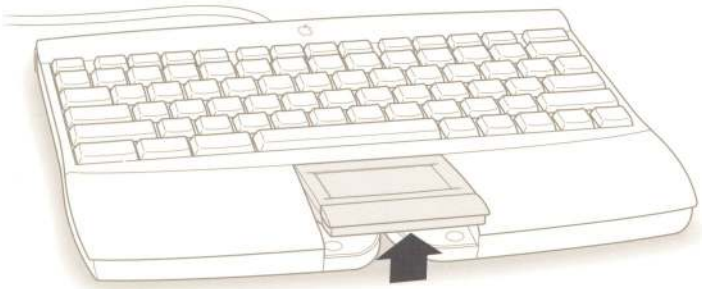
If you like, you can remove the trackpad from the keyboard and place it directly on your work surface. Follow these instructions:

1 Loosen the trackpad cable from the grooves on the back of the keyboard.

Do not unplug the cable from the keyboard while the computer is turned on. Attaching or removing an ADB device while the computer is turned on could damage the ADB device or your computer.

If you put the trackpad back in its original position later, be sure to snap the cable back into either the left or right groove on the back of the keyboard.

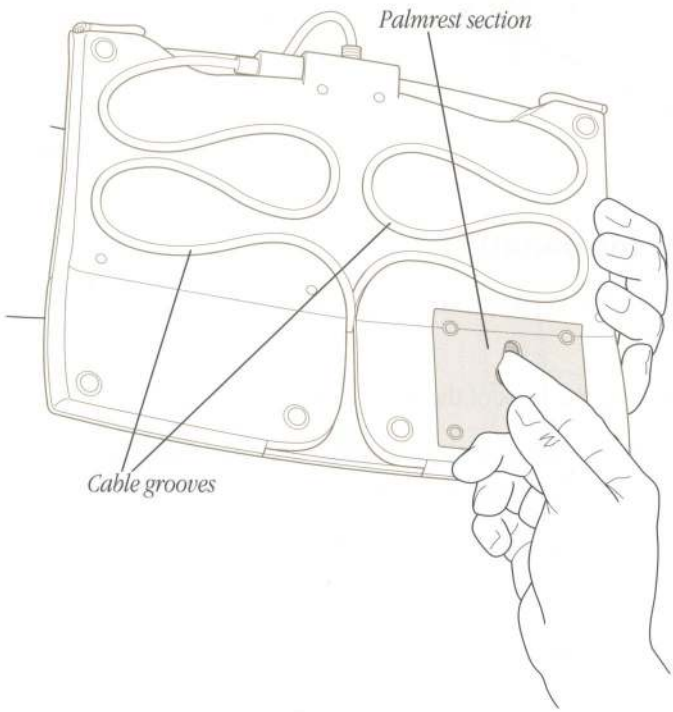
2 Lift up on the edge of the trackpad.



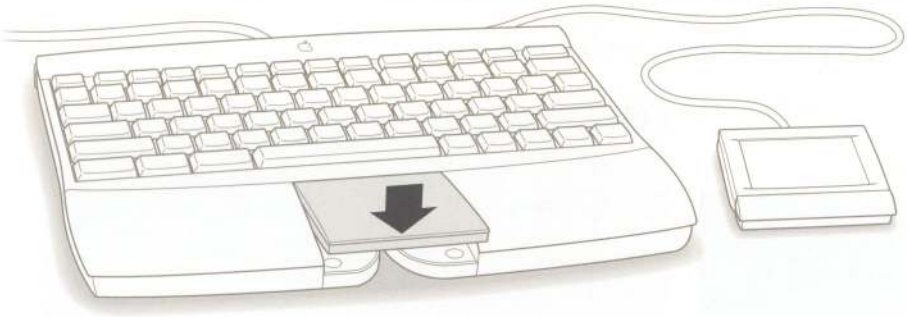
3 Lift the trackpad out and put it to the left or right of the keyboard.

4 Using your finger, remove the leather palmrest section from underneath the keyboard.

The palmrest section is for covering the space created when you remove the trackpad.



5 Snap the palmrest section into place, positioning the finger keyhole toward the rear.

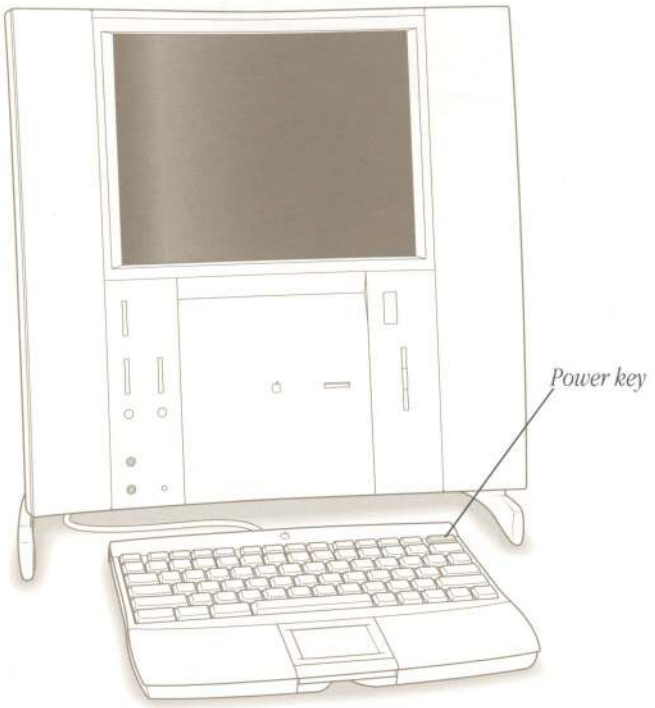


Turning the computer on

To turn on the computer for the first time, follow these instructions:

1 Turn on your computer by pressing the Power key on the keyboard.

The Power key is marked with a triangle (◁).



You hear a tone from the computer as it starts up. (Information on adjusting the speakers and bass unit is in Chapter 7, "Sound.")

2 Check to see what's on your screen.

The first time you turn on your computer you should see a multimedia Welcome Tour or the Macintosh desktop (pictured below). Skip now to "What's Next?" later in this chapter.

- If you see a blinking question mark, see Chapter 12, "Solutions to Common Problems."
- If you see anything else on your screen, or if you see nothing at all, see "Problems Turning Your Computer On?" next in this chapter.

Important If you want to turn off your computer, press the Power key on your keyboard and follow the proper shutdown procedure explained at the end of Chapter 2 in "Turning the Computer Off."

Problems turning your computer on?

If you don't see anything on the screen, check these items to see if you can identify the problem:

- Is the computer connected to the bass unit, and the bass unit plugged into a power source? If it is plugged into a power strip, is the power strip turned on?
- Is the status light underneath the bass unit on? If it isn't, try plugging the equipment into a different outlet.
- Is the status light on the front of the computer on? If it isn't, check to be sure the computer's power cable is plugged into the bass unit's cable.
- Is the keyboard cable connected correctly? It should be plugged into the ADB port, marked with the ⌁ icon. (Don't connect or disconnect this cable while the computer is on. You could damage your equipment.)
- Is the brightness control adjusted correctly? (The brightness control is marked with the symbol ☼ and is on the left under the screen on the computer.)

What's next?

Congratulations—you've finished setting up your computer. What you do next depends upon your experience with a trackpad and with Macintosh.

Have you used a trackpad?

If you've never used a trackpad, you can see a quick introduction to the trackpad and practice using it. Turn to Chapter 2, "Learning to Use Your Computer," for instructions on starting a tutorial that teaches basic skills, including trackpad skills.

Are you new to Macintosh?

If you've never used a Macintosh computer, turn to Chapter 2, "Learning to Use Your Computer," for instructions on starting a tutorial.

Are you already familiar with Macintosh?

If you are already familiar with the Macintosh, you probably don't need any printed instructions to explore your computer, so you can set this book aside for now. Later, return to this book if you want to do any of the following:

- Learn more about your computer
- Read basic information on connecting to other computers and to the Internet
- Watch TV and video or listen to audio CDs or FM radio
- Attach a printer or other additional equipment
- Add memory or an expansion card
- Find solutions to problems
- Maintain your equipment and accessories (such as the leather palmrest)

If you need to adjust the volume of your speakers and bass unit, see Chapter 7, "Sound."

Learning to Use Your Computer

If you have never used a Macintosh computer, you'll find that taking the Macintosh Tutorial is the fastest way to become comfortable with your new computer.

Learning the basics

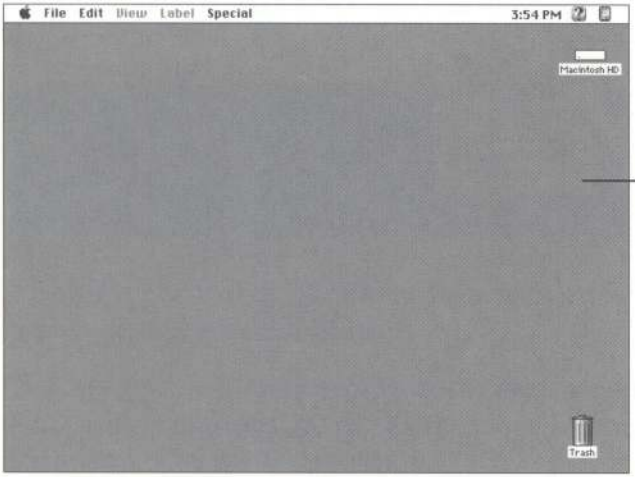
Follow the instructions in this section to start the Macintosh Tutorial.

1 If the computer is not already on, turn it on by pressing the Power key on the keyboard.

The Power key is marked with a triangle (◁).

2 Check to see what's on your screen.

The first time you turn on your computer you should see a multimedia Welcome Tour or the Macintosh desktop (pictured below).



Macintosh desktop

If you see a multimedia Welcome Tour, press and hold the ⌘ key on your keyboard while pressing Q (for "quit"). A dialog box appears asking what you want to do next. Press ⌘-Q again.

Note: You can wait for the Welcome Tour's startup message to finish playing, and quit whenever you are ready to start the Macintosh Tutorial.

3 Move your finger on the trackpad to move the arrow pointer (↖) on the screen.

Place your index finger on the trackpad and your thumb on the trackpad button. Don't press the trackpad button yet. Move your finger across the trackpad, watching the arrow on the screen. Notice that the arrow on the screen moves in the same direction that you move your finger on the trackpad.

The trackpad is sensitive not only to the direction you move your finger, but also to how fast you move your finger. If you want the pointer to move a short distance across the screen, you move your finger slowly across the trackpad. The faster you move your finger, the farther the pointer moves on the screen.

4 Move the tip of the arrow (↖) to the question mark (?) in the upper-right portion of the screen.

5 With the tip of the arrow on the question mark, press and hold down the trackpad button.

A list of choices (called a *menu*) appears. This is the Guide (?) menu, which is the place to go when you have a question about how to use your computer.

6 While holding down the trackpad button, move the arrow until the words "Macintosh Tutorial" are highlighted, then release the button.

A window appears welcoming you to the tutorial. You can set this book aside for now and follow the instructions on the screen. When you have completed the tutorial, return to this book and read the next section, "After You Take the Tutorial."

Important You can stop the tutorial at any point and go back to it later. If you want to turn off your computer, however, be sure to follow the proper shutdown procedure explained at the end of this chapter.

After you take the tutorial

If you are comfortable with the basic skills taught in the tutorial, you are ready to use your computer. You may, however, have additional questions while using the computer. This book can answer some of your questions, but there are many other convenient sources of information. The next section shows you where to find answers to your questions.

Where to find answers

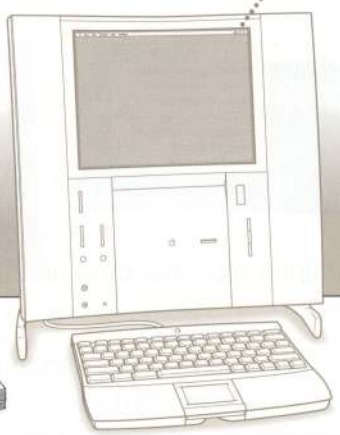
When you have questions about using your Macintosh, there are several places you can look for answers.

Apple Guide

If you need help or experience a problem while using the computer, open the Guide (?) menu and choose Mac OS Guide. The Guide menu is the main source for information while you are using the computer.

Macintosh user's manual

Use this book to help you set up your computer and learn about it, or to find solutions to problems.



Other manuals

For answers to questions about other equipment or about application programs you have purchased, see the manuals that came with the equipment or programs.

Apple's customer support hotline

If you can't find an answer in any of the materials provided, call the customer support hotline. (The phone number for the hotline is in the service and support information that came with your computer.)

Four simple tips for using Guide effectively

1 When you don't see Mac OS Guide in the Guide menu

Mac OS Guide is only available while you're in the Finder. (The Finder is the application that displays the desktop, or background of your screen, where you find and open other applications and documents.)

To go to the Finder, do one of the following:

- Click the desktop (the colored or patterned background area of your screen).
- Open the Application menu (to the right of the Guide menu) and choose Finder.

2 When you can't find the information you need

- In searching for help topics, use all three buttons at the top of Guide's initial window: Topics, Index, and Look For.
- If you're in a series of steps and want to return to a list of help topics, click the Topics button.

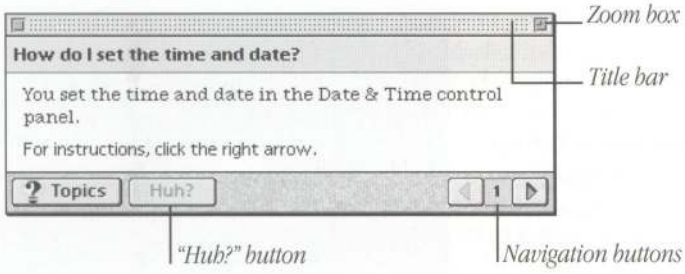
3 When you can't see what's behind the Guide window

Guide windows stay in front of other windows on the screen so that your instructions are never covered.

- Drag a Guide window by its title bar to move it out of the way.
- Click the zoom box once to shrink a Guide window. (To expand the window, click the zoom box a second time.)

4 When you need more information about an instruction or term

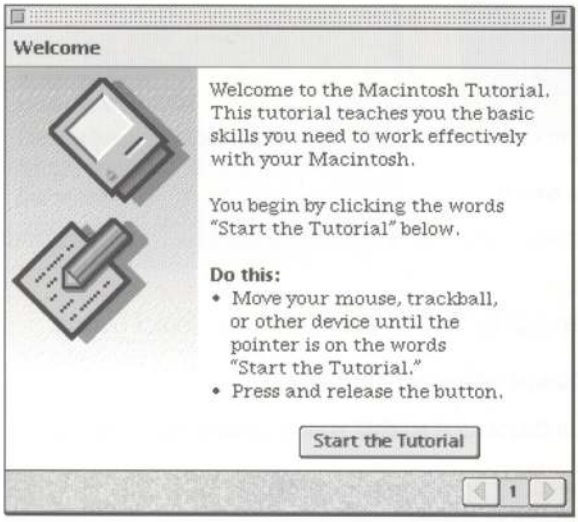
- Click the "Huh" button if it is available.

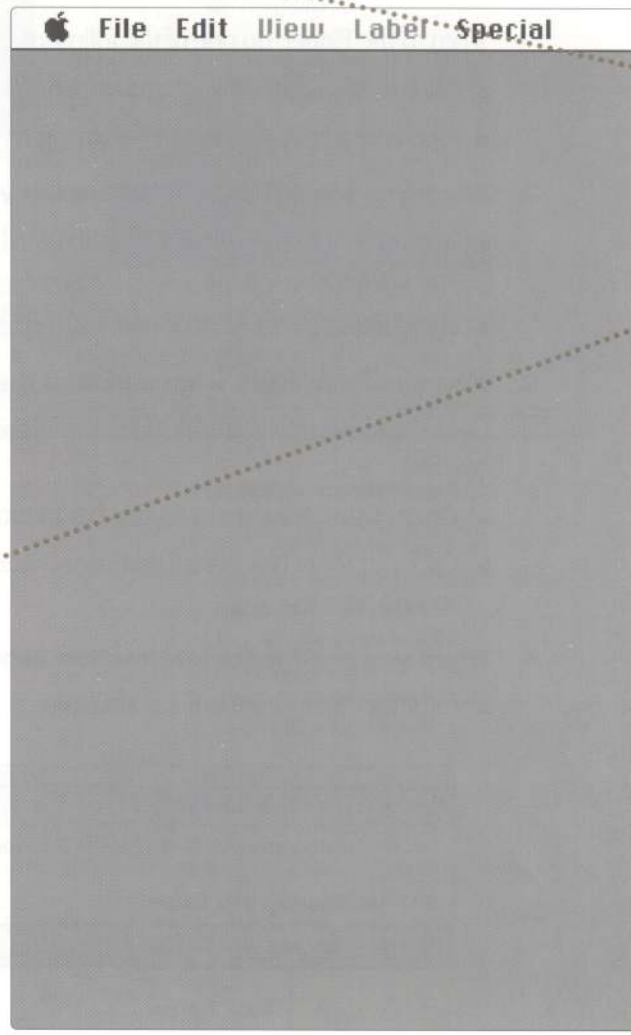


Identifying Objects

If you see something unfamiliar on the screen, open the Guide menu and choose Show Balloons. Then point to the object you want to identify. When you're done, choose Hide Balloons from the Guide menu.

This is an example of Balloon Help.





Learning the Basics

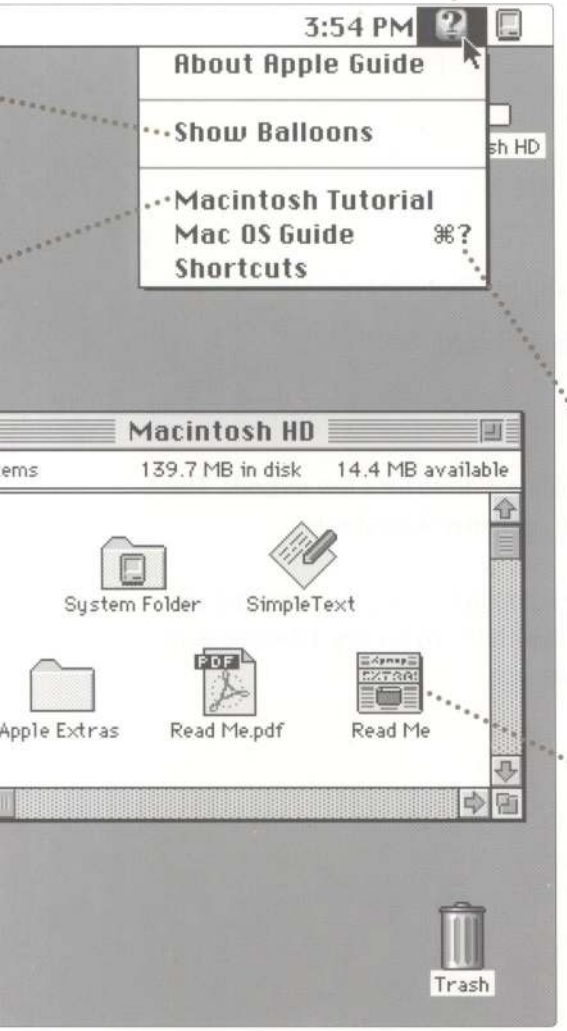
To learn basic skills, open the Guide menu and choose Macintosh Tutorial. Then follow the instructions on the screen.

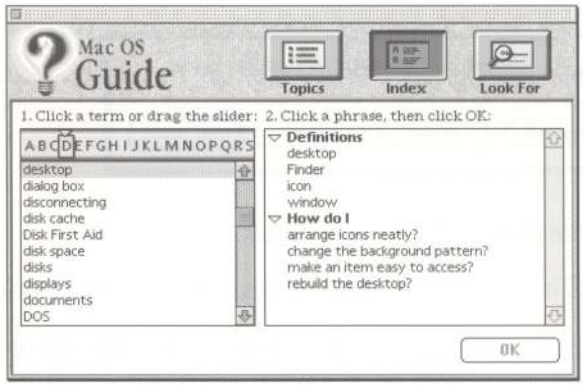
Getting Help Through the Internet

If you have an Internet connection, you can get information from the Apple World Wide Web site at http://www.apple.com. (For more information about the Internet, see Chapter 5.)

The Guide Menu

To find an answer to a question, look in the Guide (?) menu—your main source of information about your computer.





Getting Answers to Your Questions

To get answers to questions you have while working with your computer, open the Guide menu and choose Mac OS Guide or a Guide for the program you are using. Then click one of the three buttons at the top of the window: Topics, Index, or Look For, and follow the instructions to choose a topic.

Getting the Latest News

Double-click the hard disk icon to see "Read Me" files, which contain last-minute tips and news. Many other Read Me documents are in the Apple Extras folder.

Read Me documents that have "PDF" in the icon or in the filename open in the Adobe™ Acrobat™ Reader application, which is already installed on your hard disk.

Turning the computer off

To turn your computer off, follow these instructions:

1 Press the Power key (◁) on your keyboard.

The following dialog box appears on the screen:

2 Press the Return key on the keyboard.

You will be prompted to save any unsaved work before the computer shuts down.

To turn the computer on again, just press the Power key on the keyboard.

Note: There are two other methods of shutting down:

- In the Finder, choose Shut Down from the Special menu.
- Shut down more quickly by pressing the Power key and holding it down for a few seconds. The dialog box appears briefly and then dismisses itself, and the computer shuts down.

Important Do not use the power button on the back of the computer to turn the computer off unless there is a problem that prevents it from being turned off with the Power key. (You could lose unsaved work.) To make sure your work is saved, use the Power key.

Using Software

You'll probably want to purchase and install application software to use with your computer. Application programs let you, among other things, do word processing; create spreadsheets, databases, and graphics; play games, alone or with others; and explore the Internet.

Your computer includes some basic application programs as well as other software. Some are preinstalled and ready for use. Others are optional; if you want to use them, you must install them first.

This chapter explains how to install and work with application programs and describes the software that came with your computer.

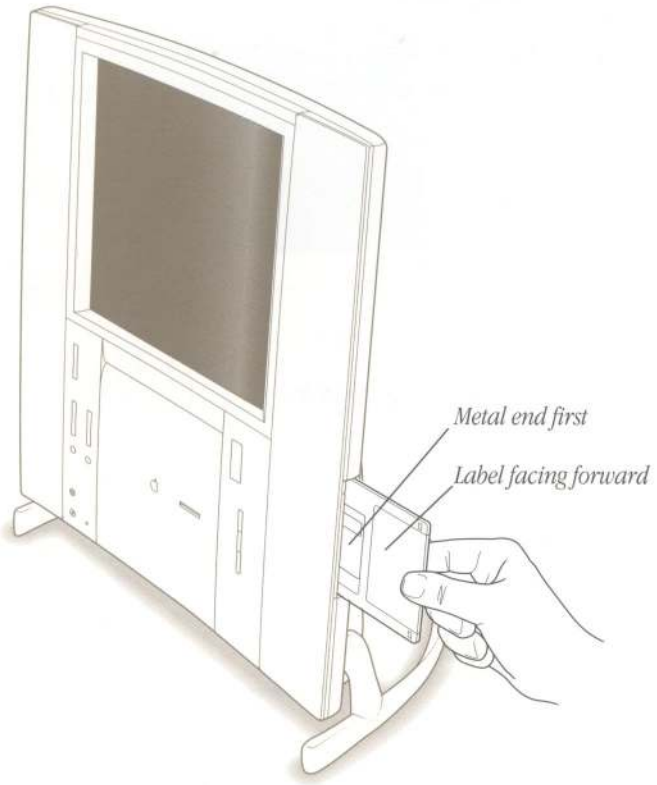
Installing application programs

Most application programs come on a floppy disk or a CD-ROM disc with an Installer program that makes it easy to install applications onto the computer's hard disk. Follow the instructions in the manuals that came with the specific applications to install them. Refer to the general instructions below for additional help on how to use the applications with the Mac OS.

If you have virus protection installed, you should turn it off before you install an application program. Also, use the Extensions Manager to turn off system extensions. For more information about Extensions Manager, see "Checking Your System Extensions" in Chapter 13, "Techniques for Diagnosing and Solving Problems."

Using a floppy disk

Some application programs come on floppy disks. The illustration below shows how to insert a floppy disk into the computer's floppy disk drive.



After you insert a floppy disk containing an application, you follow the instructions that came with the application to install it on the computer's hard drive.

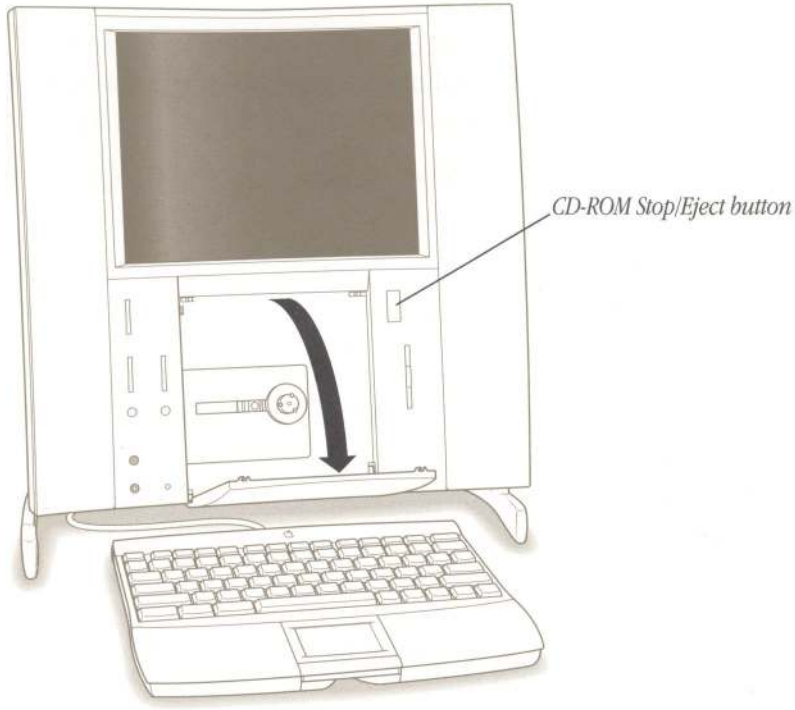
To eject the disk after installation is complete, click the disk icon to select it and choose Put Away from the File menu.

Using a CD-ROM disc

In most cases, you'll install an application program on your internal hard disk from a CD-ROM disc that contains the application. To insert a CD-ROM disc, follow these instructions:

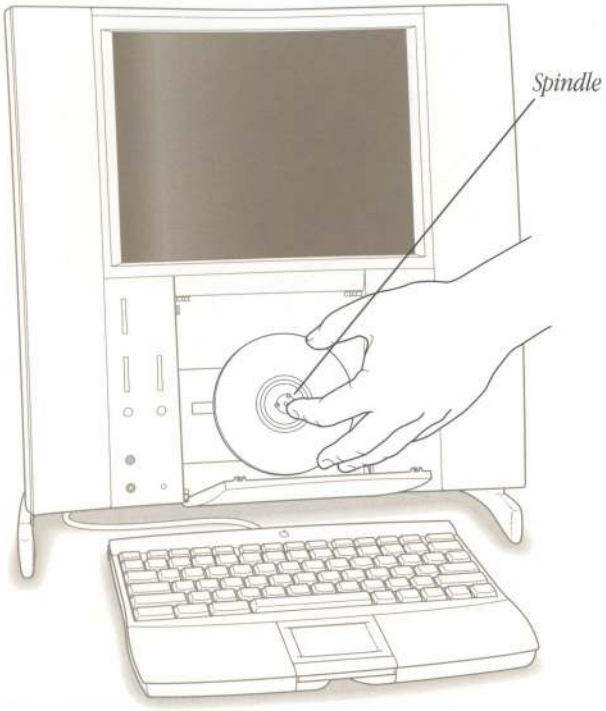
1 Open the CD-ROM drive door by pressing the Stop/Eject button.

The door opens automatically when you press the button. Never pry or pull the door open. If the door doesn't open when you press the button, see "Problems With CD-ROM Discs and Drives" in Chapter 12.



2 Press the center of the disc onto the CD-ROM drive's spindle, label side out.

Center the disc in the drive, handling the disc by its edges, then press on the center of the disc (near the hole) to be sure that the disc is firmly in place.



3 Close the CD-ROM drive door.

After you insert the disc containing your application program, follow the instructions that came with the application to install it.

To eject the disc after installation is complete, click the disc icon to select it and choose Put Away from the File menu.

The illustration below shows how to remove a CD-ROM disc.

Important Do not copy the entire contents of a CD-ROM disc onto your hard disk. (Don't drag the disc's icon to your hard disk.) If you copy the entire contents of a CD-ROM disc, it will take up a lot of space on your hard disk. When you open applications on some CD-ROM discs, you may get a message telling you to copy or install the application onto your hard disk. If you get this message, refer to the installation instructions that came with the CD-ROM disc, or double-click the CD-ROM disc's icon to open it, and then copy the CD-ROM disc's application onto your hard disk.

Remember that you only need to copy an application once. From then on, open the copy that's on the hard disk.

Installing applications over a network

If your computer is connected to a network, you may find applications on it that you can install on your computer. Though you can run Installer applications over a network to install applications, it is usually faster to first copy the application and its Installer onto your computer, and then run the Installer to complete the installation. Double-click any Read Me file you see, and carefully read it and other instructions you find with the application you want to install.

Opening an application program and its documents

You open an application the same way you open other items—by double-clicking its icon.

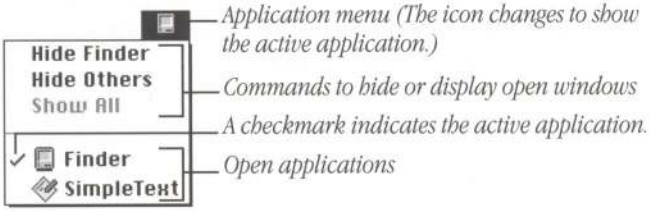
When you double-click a document's icon, both the document and the application that created it open.

Once you are working in an application, you can open other documents in that application by opening the File menu and choosing Open.

Working with several applications at a time

You can open as many applications and desk accessories as your computer's random-access memory (RAM) allows. (If you see a message that you have insufficient memory to open an application or document, you may have too many applications open.)

The Application menu in the top-right corner of the screen lists the applications you have open. The name of the active application (the one you're using right now) has a checkmark next to it, and its icon appears in the menu bar.



Finding out which applications are open

If you have several applications and windows open, you can find out which application is active and which other applications are open by opening the Application menu.

Switching applications

You can switch to another open application by choosing its name from the Application menu.

If an application's icon is dimmed in the menu, that means its windows are hidden. If you choose the application from the Application menu, its windows become visible.

You can also switch to another application by clicking in one of its windows or by double-clicking its icon or the icon of a document that was created with the application.

Hiding and showing windows on the desktop

You can hide all windows except those of the active application by choosing Hide Others from the Application menu. The other applications remain open even though their windows are hidden. When you switch to another application, its windows become visible again.

When an application is active, its name is displayed in the Application menu next to the word "Hide." Choose the Hide command to temporarily hide the application's open windows. (This helps to quickly clear up a cluttered screen.) For example, if the Finder is active, you can hide it by choosing Hide Finder from the Application menu.

If you want to see all the open windows, choose Show All from the Application menu.

Five tips for using application programs effectively

1 Use Power Macintosh applications.

Your computer is compatible with most application programs intended for use with Macintosh computers, but it's best to use applications designed especially for Power Macintosh computers. (Sometimes these applications are marked "Accelerated for Power Macintosh.")

2 Put only one copy of each application on your hard disk.

Having more than one copy can cause errors.

3 If you experience problems with an application, try reinstalling.

If an application malfunctions consistently, try installing a fresh copy. If that doesn't help, find out from the software manufacturer whether your version of the application is compatible with the hardware and system software you're using.

4 Don't install additional System Folders.

Whenever you copy an application disk to your hard disk, be careful not to copy another System Folder. Your startup disk should only contain one System Folder. Drag any extra System Folders on your hard disk to the Trash.

5 Use virtual memory if necessary.

If you run out of memory while using Power Macintosh applications, you can use space on your computer's hard disk as additional memory (called "virtual memory"). For instructions, choose Mac OS Guide from the Guide (?) menu and read the information under "memory" in the Guide's index.

You can also add more memory to your computer, as described in Chapter 10, "Installing Expansion Cards and Memory."

About the software included with your computer

Your computer includes several kinds of software. Some is preinstalled and ready for use; other software you need to install before you can use it. The types of software that come with your computer include these:

- the Macintosh Operating System (Mac OS) software and preselected system software additions, already installed on your computer
- extra system software additions that you can install yourself
- application programs

The following sections provide details about the included software.

Mac OS software and preselected system software additions

The Macintosh Operating System (Mac OS) is the basic software that runs the computer itself. It tells the computer what to do when it starts up, keeps track of your documents, files, and other software, and helps your computer find out what devices—such as printers and network cables—are attached to it.

The Mac OS was installed on the internal hard disk at the factory, and starts automatically when you turn on your computer. Here is some of the software that makes up the Mac OS basic system:

- The Finder, the program that displays the *desktop* and allows you to organize documents, files, and application programs into folders
- QuickTime, which lets you play digital video on your computer
- OpenDoc, which lets you build a document that can include text, graphics, movies, links to the Internet, tables, and many other types of information

  An OpenDoc document isn't created within a specific application program. Instead, you create a document first, and then embed in it the "parts" you want to use. Each part is like an application program, offering a rich set of features; a single document can draw on the resources of many parts. A variety of parts will be available from both Apple and third-party sources.
- PC Exchange, which lets you work with DOS and Windows disks as if they were Mac OS disks

- AppleScript, which allows you to automate tasks in the Finder and other scriptable applications (applications that support AppleScript). Instructions for using AppleScript are in the Apple Extras folder on your hard disk.

The following are preselected system software additions, already installed on your computer along with the Mac OS basic system:

- QuickDraw 3D, to view and manipulate 3D images on your computer
- MacLinkPlus translators, to easily open documents (including DOS and Windows documents) created in applications you don't have. These translators work with the Mac OS Easy Open control panel.

Important System software is preinstalled on your computer. Do not reinstall system software unless you are experiencing problems or you want to upgrade to a more recent version. Consult Chapter 13, "Techniques for Diagnosing and Solving Problems," before attempting to reinstall system software.

Extra system software additions you can install yourself

Your computer comes with additional software that adds additional capabilities to the Mac OS. This software was not installed at the factory, so you have to install it if you want to use it.

Tip: Some of this software can decrease the amount of random-access memory (RAM) available for use by application programs, even when it is not in use. To conserve RAM, only install the software you think you'll use.

These are some of the extra system software additions that you can install yourself:

- QuickDraw GX, for enhanced printing and typographical capabilities
- English Text-To-Speech, to have your computer read text aloud
- Cyberdog, an application to access the Internet.
- Apple Remote Access Client, to connect to a remote computer (such as your computer at work) using a modem
- Open Transport PPP, to connect to the Internet using a modem

You can install one or more of the extra system software additions from the system software CD that came with your computer. See the section "Performing a Custom Installation" in Chapter 13 for instructions.

Application programs

Your computer comes with application programs to play QuickTime movies, to play audio CDs in your CD-ROM drive, and to open HyperCard stacks. It also includes Internet access applications such as the Apple Internet Connection Kit. (For more information about the Apple Internet Connection Kit, see Chapter 5, "Connecting to the Internet or an Online Service.")

To see which applications are already installed on your hard disk, double-click the hard disk icon to open it, then double-click the Apple Extras folder to open it. Many applications are in the Apple Extras folder.

Apple Extras folder, containing extra applications

You also received a CD-ROM disc that contains backup copies of the system software and the applications preinstalled on your computer's hard disk. It also contains additional applications that you can install yourself.

To see what's on the CD-ROM disc, insert the disc into your computer's CD-ROM drive. Double-click the CD-ROM disc's icon to open it (if it is not already open). Then double-click the folders in the disc's window to find out what's included on the CD-ROM disc.

To install an application, look for an Installer icon (similar to the one below) for the application. Double-click the Installer and follow the instructions on the screen.

If the application doesn't have an Installer, you can simply drag the application from the CD-ROM disc to your computer's hard disk.

If you have questions about using an application program, open the Read Me file for the application, which is usually found inside the application's folder. Some applications also have onscreen help that you can access after you have installed the application. Look for onscreen help in the Guide (?) menu after you start the application.

Backing up your files

Making backup copies of important files is good protection against possible damage to the originals.

- You can back up files stored on your hard disk by putting copies of them on floppy disks. (To copy a file onto a floppy disk, insert the floppy disk into the floppy disk drive, then drag the file's icon to the floppy disk's icon.)
- You can back up an entire floppy disk by copying it to another floppy disk of the same capacity or larger, or by copying it to a hard disk.
- You can use a commercial backup application to copy new and changed files from a hard disk to another hard disk, a tape drive, a series of floppy disks, or to another form of removable media.
- If your computer is on a network, you may be able to back up files by copying them to a shared disk on the network.

Part Two

Communicating With Other Computers

Chapter Four

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Chapter Five

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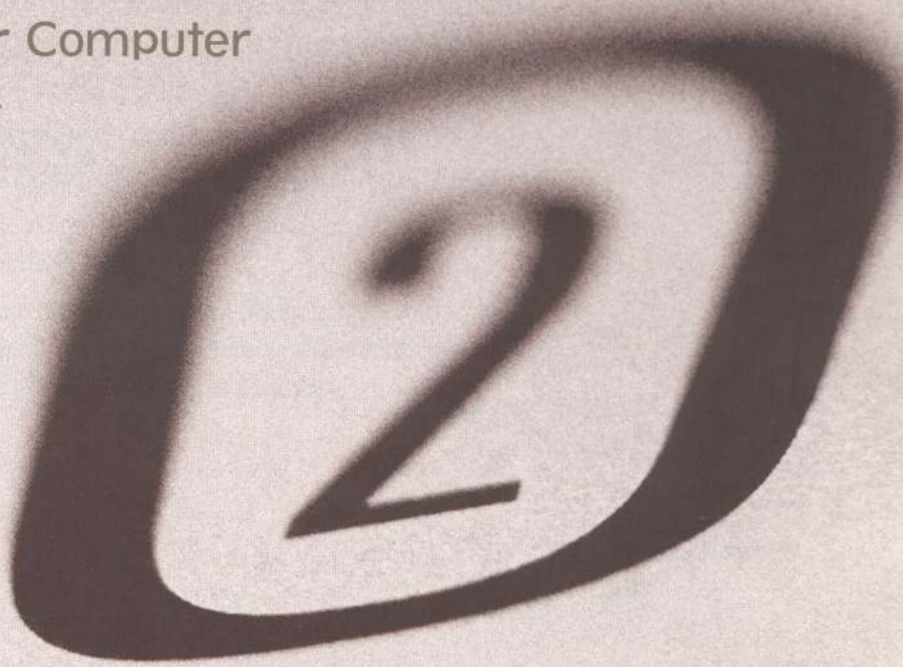


Connecting Your Computer to a Telephone Line

A world of information is now available online. By connecting your computer to a telephone line, you can access the Internet, send and receive electronic mail (e-mail) and faxes, and connect to online services like America Online and CompuServe. You can also use a telephone line to connect to other computers. For example, you can telecommute by connecting to your company's computers from home.

When you connect over the telephone line to a spread-out network like the Internet or an online service, you are participating in a wide area network. This is different from connecting to a local area network where the computers are linked together by cable connections. You may have a local area network at your work place.

This chapter provides a brief introduction to the equipment you need to connect to a telephone line. This chapter also explains how to use the modem that came with your computer to place and receive telephone calls and voice mail, and to send and receive faxes.

For information on connecting to an online service or the Internet, see Chapter 5. If you want to set up or connect to a local area network, see Chapter 6.

Types of equipment

There are three types of equipment you can use to connect to a telephone line: a modem, an ISDN line, and telecommunications equipment you share with others on a local area network.

Modem

A modem is the most common means of connecting a computer to a phone line, particularly if you are using your computer at home. A modem works with standard analog telephone lines. Your computer comes with a GeoPort adapter that gives you access to the computer's modem. For instructions on using your computer's modem, see "About Your Computer's Modem," later in this chapter.

ISDN line

An Integrated Services Digital Network (ISDN) line is a special digital phone line that is about four times faster than the fastest modem used over a standard analog telephone line. However, an ISDN line typically costs more than regular phone service and may not be available in your community.

Connecting to an ISDN line

If you routinely need to send and receive large files, and find that a 33.6 kbps modem is not fast enough for your needs, you may want to consider connecting your computer to an Integrated Services Digital Network (ISDN) digital telephone line, which can transfer data at up to 128 kbps, nearly four times as fast as a 33.6 kbps modem.

ISDN lines are available to many but not all residential and business telephone customers. Check with your local phone company to see if ISDN service is available at your location.

There are fixed monthly charges and per-minute usage fees for ISDN, just as for regular phone service. Typically, ISDN costs a bit more than regular phone service. However, one ISDN line can support several devices simultaneously—such as a computer, voice phone, and fax machine—so you may be able to replace existing extra phone lines with one ISDN line.

Note: Because an ISDN line requires a power source at your location, a phone attached to an ISDN line will not work during a power outage. For emergency use, you should consider keeping your regular phone line (which receives power from the phone company) as a backup.

Setting up an ISDN line

If you're interested in setting up an ISDN line, first contact your local phone company to see if ISDN service is available at your location. Your phone company can also provide specific information about monthly charges and usage fees. (Your phone company may also charge an installation fee, which is sometimes waived or refunded if you agree to keep the ISDN line for a specified amount of time.)

In addition, you need to purchase either an ISDN terminal adapter or an ISDN PCI expansion card. The ISDN terminal adapter, also called an ISDN modem, is an external device that plugs into the modem port on the back of the computer. The ISDN PCI expansion card is an internal device that you install into the computer's PCI expansion slot. Either the terminal adapter or the PCI expansion card can supply the ISDN port where you connect your ISDN line.

Some ISDN equipment may be difficult to configure with the network configuration of your employer or Internet service provider (ISP). Work closely with your Internet service provider or computer network administrator to make sure you purchase compatible ISDN equipment.

Shared telecommunications equipment on your network

One of the advantages of a local area network is that you can share equipment, such as printers and file servers. If your computer is linked by a cable connection to a local area network, there may also be shared telecommunications equipment connected to the network that allows you (or anyone else on your network) to connect to the Internet or an online service. Contact your network administrator for more information. You can also find general information about networks in Chapter 6, "Connecting Your Computer to a Network."

About your computer's modem

Your computer comes with a 33,600 bps (33.6 kbps) modem, one of the fastest modems currently available. To use the modem you must attach the GeoPort Telecom Adapter, following the instructions in Chapter 1, "Setting Up."

What is a modem?

A modem is a piece of equipment that takes data from your computer, converts it into a series of tones, and transmits the tones over telephone lines. A modem on the other end of the line converts the tones back into the original data, so the receiving computer can use the data. The modem that came with your computer can send and receive data in this way.

The modem enables your computer to send and receive electronic mail (e-mail) and files, connect to the Internet, and access online services. Your modem also lets you transmit documents on your computer to fax machines and receive faxes as documents that you can view on screen or print.

In some locations, the modem and telephone can share a single phone line. Keep in mind that if your phone and a modem share a line, you will not be able to use both at the same time, even if they are attached to separate phone jacks. While you use a modem, outside callers get a busy signal and you cannot call out. Conversely, when you use your phone, you cannot use the modem. If your telephone service has a call-waiting feature, turn it off while you're using the modem.

If you miss phone calls because you often use your modem, you may want to get a second phone line installed or get a phone company message service which, unlike an answering machine, will record messages even when your phone is off the hook or you are online.

Also keep in mind that long-distance charges accrue when your modem dials long-distance numbers. In most cases, an online service or an Internet service provider will have a local access phone number so that long-distance charges do not apply.

Using your modem

Your computer comes with several communications applications that use the modem. There are two applications you can use to connect to the Internet or an online service:

- *The Apple Internet Connection Kit,* a set of application programs that help you get onto the Internet quickly and easily
- *America Online (AOL),* an online information service that provides Internet access (not available in all regions)

More information about these applications and the Internet in general is in Chapter 5, "Connecting to the Internet or an Online Service."

Your computer also comes with the Apple Telecom software, including the following programs:

- *Apple Address Book,* which lets you create your own address books
- *Apple Fax,* which lets you send, monitor, and manage faxes
- *Apple Phone,* an automatic dialing and voice mail system for managing messages
- *The Express Modem control panel* for adjusting your modem's settings

All four Apple Telecom programs are already installed on your computer. This section explains how to start using them. You can also find detailed information about using these programs in Apple Telecom Guide, available in the Guide (?) menu when one or more of these programs is open.

Apple Address Book

Apple Address Book lets you create detailed address books to store individuals' and companies' fax numbers, addresses, and other information. You can import information from other programs, search an address book for specific entries, and send faxes directly from an address book.

To start Apple Address Book, follow these instructions:

1 Open the Apple (🍎) menu and choose Apple Telecom Status.

2 Click the Apple Address Book icon.

Apple Address Book icon

3 Enter the information you want in the Personal Info dialog box.

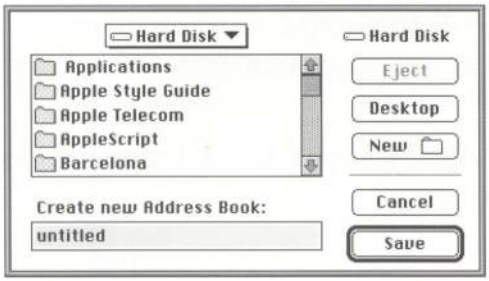
Country pop-up menu provides name and country code.

The information you enter in this dialog box is used by both the Apple Address Book and Apple Fax applications. Updating this information in one application also updates it in the other. If you have already opened and entered personal information in Apple Fax, this information appears in the Personal Info dialog box when you open Apple Address Book.

If your country does not appear in the Country pop-up menu, you can add it to the Apple Address Book Country preferences, then update the Apple Address Book Personal Info preferences. For instructions, open the Guide (?) menu and choose Apple Telecom Guide.

4 Click OK.

5 In the dialog box, enter a name and choose a location for the address book, then click Save.



A new, empty address book window is opened for you. You can create as many address books as you want to organize your information. Each address book that you create is an independent file with no relationship to other address books.

For more information on using Apple Address Book, open the Guide (?) menu and choose Apple Telecom Guide.

Apple Fax

Apple Fax lets you convert any Macintosh document to fax format and send it to a fax machine or to another computer capable of receiving faxes. You can send a fax to several individuals at once, automatically resend it if the transmission fails, convert fax documents to text (using OCR, or "optical character recognition," technology), and view, print, and edit faxes.

Apple Fax supports the following speeds: V.17, V.29, and V.27 high-speed fax, sending and receiving at 14400, 12000, 9600, 7200, 4800, and 2400 bits per second (bps).

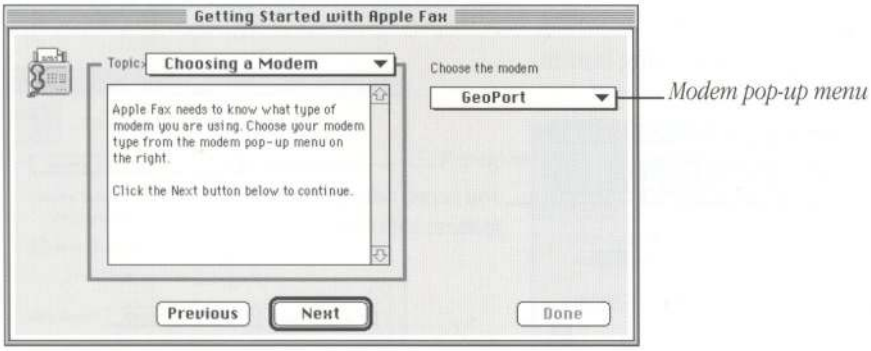
To start Apple Fax, follow these instructions:

1 Open the Apple (🍎) menu and choose Apple Telecom Status.

2 Click the Apple Fax icon.

3 Read the introductory text, then click Next.

4 Choose your modem type from the modem pop-up menu, then click Next.

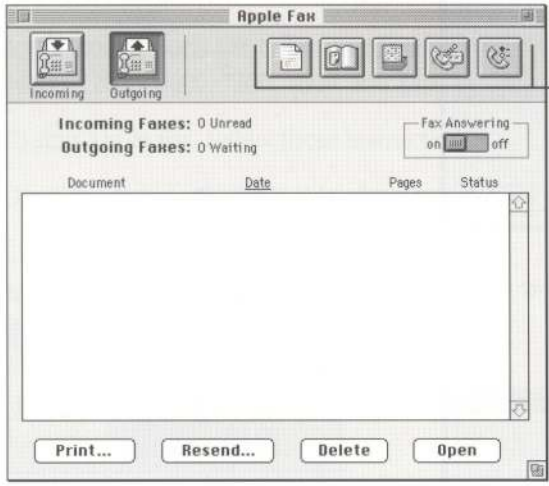


5 If you want to adjust any of your fax settings, follow the instructions in the "Changing your settings" panel that appears.

6 Click Done to confirm your settings and close the "Getting Started with Apple Fax" window.

After you start and specify your Apple Fax settings for the first time, the Apple Fax main window appears in Outgoing view.

Outgoing view displays your sent faxes. Incoming view displays your received faxes. To choose the view you want, click the Outgoing or Incoming button.

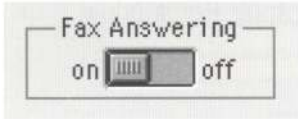


You access other program features with these buttons.

Preparing to receive faxes

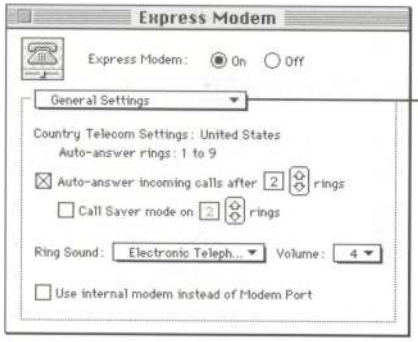
To set Apple Fax to receive faxes automatically, follow these instructions:

1. Open the Apple Fax main window.
2. Drag the Fax Answering button to "on."



3 Choose Control Panels from the Apple (🍎) menu and open the Express Modem control panel.

4 Choose General Settings from the pop-up menu.



5 Click to put an X next to "Auto-answer incoming calls."

If the Express Modem control panel is not set to auto-answer, you will not receive incoming faxes, even with Fax Answering on. Apple Fax now receives incoming faxes automatically. The Apple Fax window does not have to be in front, or even open, in order to receive a fax.

For more information on using Apple Fax, open the Guide (?) menu and choose Apple Telecom Guide.

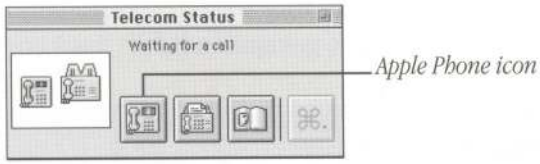
Apple Phone

Apple Phone lets you place and receive telephone calls using your computer. You can also set up the computer to act as an answering machine.

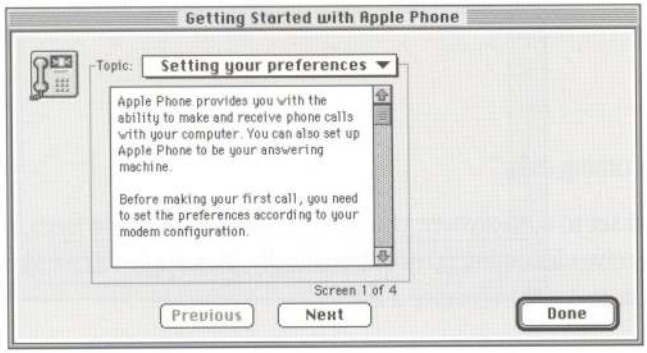
To start Apple Phone, follow these steps:

1 Open the Apple (🍎) menu and choose Apple Telecom Status.

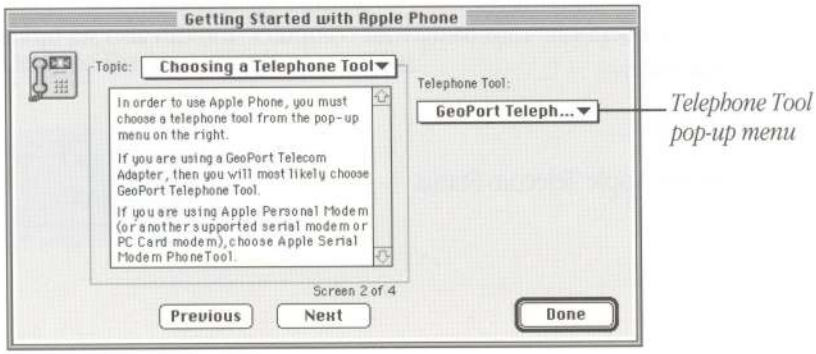
2 Click the Apple Phone icon.



3 Read the introductory text, then click Next.

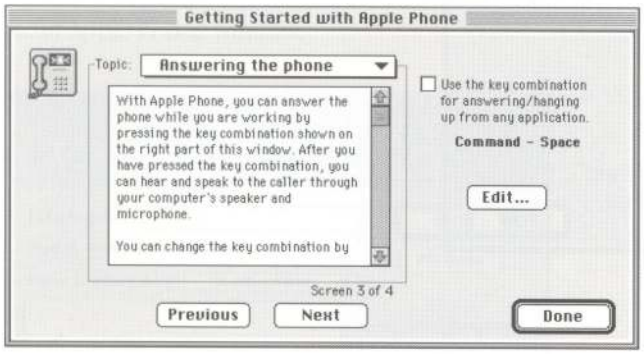


4 In the Telephone Tool pop-up menu, choose the telephone tool that corresponds to your modem.



5 Click Next.

6 In the "Answering the phone" panel, click Edit; then enter the keyboard shortcut you will use to answer calls with your computer (letting you hear and speak through the computer's speaker and microphone).



The default keyboard shortcut is Command (⌘)–Space bar, but you can use any key combination you like. If you select the checkbox, you can then use the keyboard shortcut to answer calls even when Apple Phone is not open and you are working in another program.

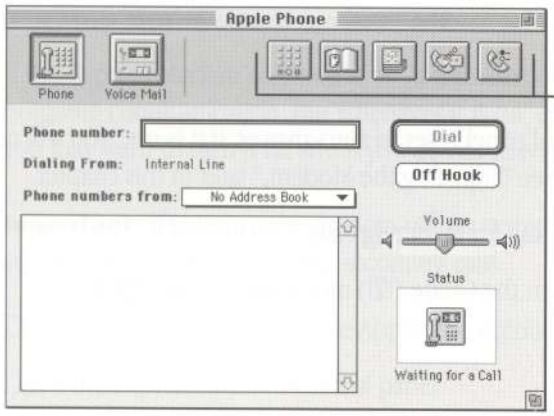
Note: Choose a key combination that is not used frequently within other programs. For example, do not use ⌘-P, ⌘-Q, or ⌘-A.

7 If you want to adjust any of your Apple Phone settings, follow the instructions in the "Changing your settings" panel that appears.

8 Click Done to confirm your settings and close the "Getting Started with Apple Phone" window.

After you start and specify your Apple Phone settings for the first time, the Apple Phone main window appears in Phone view.

Phone view lets you place and answer phone calls. Voice Mail lets you manage message box greetings and voice messages. To choose the view you want, click the Phone button or Voice Mail button in the main Apple Phone window.



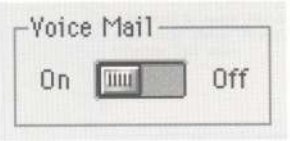
You access other program features with these buttons.

Note: If you did not create an address book and add entries to it, "No Address Book" appears in the "Phone numbers from" pop-up menu.

Turning voice mail on

To turn voice mail on, follow these steps:

1. In the Apple Phone main window, click the Voice Mail button to display Voice Mail view.
2. Drag the Voice Mail button to On.



Note: Make sure that the Express Modem control panel is set to auto-answer. If it is not, you will not receive incoming calls, even with Voice Mail on. See "Adjusting the Modem," later in this chapter.

3. Set up the Main message box and prepare a greeting for incoming calls.

   For more information on using Apple Phone, open the Guide (?) menu and choose Apple Telecom Guide.

Adjusting the modem

You use the Express Modem control panel to turn the modem on and off, and specify certain settings.

Note: Normally you use a modem in conjunction with communications software, which automatically controls your modem's settings. However, any settings you specify in the Express Modem control panel take precedence over settings made by your communications software. You may want to check the settings in the control panel if your communications software does not behave as intended.

Turning the modem on and off

If the Express Modem software is off, it is turned on automatically when an application needs it for an outgoing communication. But whenever it is on, the modem uses about 600K of system memory, so you may want to turn it off when you do not need it. Follow the instructions below.

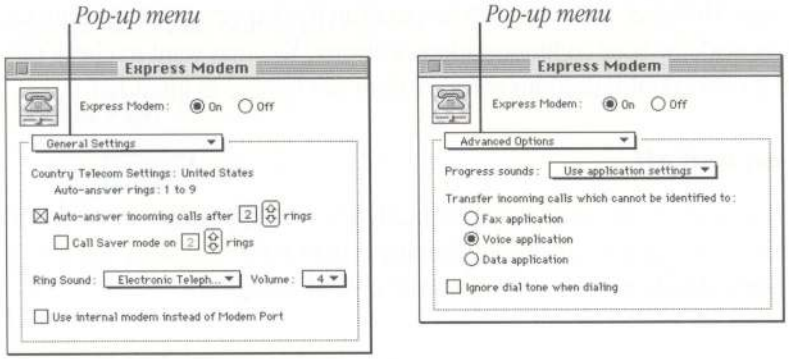
Important If you turn the modem off, no communications program that uses the Express Modem software will be able to receive incoming calls.

1. Choose Control Panels from the Apple (🍎) menu.
2. Open the Express Modem control panel.
3. Click the On or Off button to select it.

4. If an alert message appears, click OK to acknowledge the message and complete what you are doing.

Specifying the settings

You specify Express Modem settings in the General Settings and Advanced Options panels, shown below. Press the pop-up menu to choose either panel. The settings are described next.



Country Telecom Settings

The Country Telecom Settings display the current country and the number of rings possible for auto-answer. You cannot edit these fields.

Auto-answer incoming calls

When "Auto-answer incoming calls" is selected, and at least one communications program is set to auto-answer, the modem software automatically answers incoming calls after the number of rings specified in the ring number field. Calls are answered according to priorities described in "Call Management," later in this section.

The checkbox and ring number field override the auto-answer setting of any communications program that uses the modem software. If you want to receive calls in any of your communications programs, make sure that this checkbox is selected and the number of rings specified.

If you want to prevent your modem from answering incoming calls, click to remove the X from the checkbox. If you do this, the modem will not answer calls even if a communications program is set to auto-answer.

Note: If your modem shares a line with your telephone, and you want to make sure that the modem does not answer your incoming calls before you do, you can either deselect the "Auto-answer incoming calls" checkbox or set the number of rings to a high value.

Call Saver mode

Call Saver mode lets you save money on connection charges when you retrieve voice messages from a remote location. If there are new messages and Call Saver mode is selected, the modem answers your call at the number of rings set in the Call Saver ring number field. If there aren't any new messages, the modem does not answer after the Call Saver ring number setting. You still have time to hang up before the modem answers your call.

To operate correctly, Call Saver mode requires that the value in the Call Saver ring number field be at least two rings less than the value in the auto-answer ring number field. For example, you can set auto-answer to five rings and Call Saver to two rings. If your voice mail does not respond by the third ring, then you know that there are no new messages.

Ring Sound

From the Ring Sound pop-up menu, you can choose the sound that your computer plays when you receive an incoming call. You can also install and use your own sounds.

For more information on installing additional sounds, open the Guide (?) menu and choose Mac OS Guide when the Finder is active.

Progress sounds

You can monitor the sounds of a fax in progress by choosing one of the settings in the Progress sounds pop-up menu:

- *Use application settings:* Lets you control the speaker volume from your communications software (and from the Sound control panel)
- *Turn off:* Turns the speaker off for applications that use the modem
- *Keep on until carrier:* Leaves the speaker on until a connection is established

Call management

When a call comes in, your modem tries to identify the type of call it is by detecting calling tones. The modem then checks to see which programs are set to auto-answer and connects the incoming call to the appropriate program. This is known as *incoming call management.*

While the modem is on, it answers calls automatically according to the following rules:

- The modem only answers if "Auto-answer incoming calls" is selected in the control panel.
- The modem only answers if at least one program is set to auto-answer.
- If several different programs are set to auto-answer, the modem uses calling tone detection to identify the type of call, then sends it to the corresponding program.

Since not all calling devices use calling tones, some calls cannot be identified. To enable the modem to answer unidentified calls—when calling tone detection is unsuccessful—use the "Transfer incoming calls" buttons to choose the type of application program—Fax, Voice, or Data—you want to answer unidentified calls. If you expect to receive both voice and data calls, ask your callers to send a data calling tone when calling your machine.

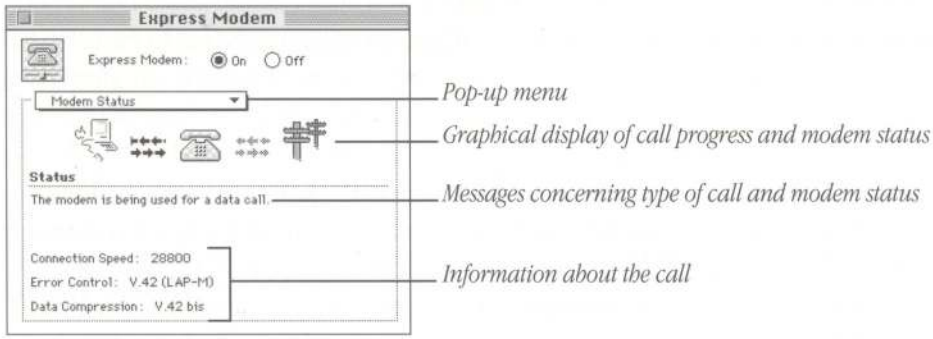
Make sure the fax, voice, or data program you designate to handle unidentified calls is set to auto-answer.

Ignore dial tone when dialing

When the "Ignore dial tone when dialing" checkbox is selected, the modem dials even though a dial tone cannot be detected. (This feature is sometimes called "blind dialing.") It is a useful feature for locations with a PBX system, such as hotels, where the modem may have difficulty recognizing the PBX dial tone.

Checking the modem's status

To check the modem's status, choose Modem Status from the pop-up menu. The modem's Status panel shows the modem's current state, type of connection, and call progress as well as information about outgoing data calls, including connection speed, error control, and data compression.



Connecting to the Internet or an Online Service

This chapter discusses how you use your Macintosh to connect to the fastest growing organization on Earth: the online community. This community gathers in private places provided by subscriber-only services and in the public space called the Internet. With a modem and the right software, you have a couple of options for reaching these meeting places. Once you arrive you can exchange e-mail messages, browse the World Wide Web, gather information on topics of interest to you, participate in discussion groups, download software, and use many other services. This chapter provides some explanations and instructions to help you connect.

About the Internet and its language

The Internet, or "Net" as it's sometimes called, is a loosely knit federation of computer networks that "speak" the same language. The language in this case is a communications standard known as the *Internet Protocol,* or *IP.*

No one individual or company owns the Internet, and the individual computers and the networks of computers knitted into it are located all over the world. Originally created for military purposes, the Internet developed dramatically as universities began using it to share information and data. It has now become an expansive resource for millions of users around the world, catering to virtually every imaginable interest.

You may come upon the term *TCP/IP,* or *Transmission Control Protocol.* TCP/IP is the series of protocols used for sending data across the Internet. Sending a message across the Internet involves a three-step process. First, a network computer breaks up the data that make up the message into several smaller data packages, each of which conforms to a strict set of guidelines. These guidelines are called *TCP.* Once the computer has properly prepared the packages, it sends them out for delivery. The packets' addresses, directions on how to deliver them, and other routing specifications are dictated by the other set of guidelines mentioned earlier, Internet Protocol (IP). Because of the Internet's complexity, the packages may not travel together, even though they are bound for the same address, and may even arrive at different times. Using TCP, the computer at the receiving end unscrambles the packets and sorts the data to recreate the original message.

Using your modem to connect to an Internet service provider or an online service

Once you have physically connected your modem to a phone line, you have several choices to make before you can get to the Internet. First, you must connect to and open an account with an electronic service provider. Providers fall generally into two categories: Internet service providers (ISP) and online services. Each has its distinct qualities; both charge a fee for your account. Your Macintosh comes with the Apple Internet Connection Kit (AICK), which helps you connect with an ISP. Your Macintosh may also come with America Online (AOL), an online service available in some regions.

Connecting with the Apple Internet Connection Kit

The facilities of an Internet service provider let you use your computer to get onto the Internet. Although some ISPs offer other services, Internet access is their main business. Once you connect with an ISP, you have unlimited access to the Internet because your connection with the ISP actually turns your computer into a part of the network itself.

All the software you need to connect with an ISP is included with your computer in the Apple Internet Connection Kit (AICK). This software package helps you select and set up an account with one of several ISPs and helps you set up your Internet connection software. AICK also contains several other software utilities designed for the Internet. For more information and instructions, see the *Apple Internet Connection Kit: Getting Started* manual, which you'll find in the Apple Extras folder on the computer's hard disk (as an electronic document), or in the box with your computer.

Connecting with America Online (not available in all regions)

Unlike ISPs, online services provide additional services for their members alone. An online service may offer e-mail, updated news, sports scores, stock price updates, special chat groups, and other services as well as a connection to the Internet. Some, like AOL, also offer their own software for use on the Internet. Online services work differently from ISPs in that they filter and funnel some of the data before you receive it and do not make your computer an actual part of the Internet. This allows such services to tailor the Internet access they provide their members. For example, Internet sites deemed not suitable for children can be placed off limits. You might consider this in deciding whether to select an online service or an ISP.

If AOL is available in your region, you may want to use it if you have never used an online service or the Internet before. For more information about AOL, see its folder on your hard disk or on the CD that came with your computer. After you start AOL, refer to AOL's onscreen help for assistance on establishing an account with AOL.

Note: In regions where AOL service is not available, the AOL software is not provided on your computer's hard disk or CD.

What the connection software does

Once you have selected a service that will get you to the Internet, you must establish a phone link with the service and configure your modem so that it can "speak" with the service's computers. Like the TCP/IP language spoken among computers on the Internet, your modem communicates with the service's computers in an industry-standard language, called Point-to-Point Protocol, or PPP. The data sent by your computer in PPP is converted by the service's computers into TCP/IP and then is sent out over the Internet. When data arrives from the Internet, the translation process occurs in reverse.

When you use AICK, the Internet Dialer program establishes and configures the PPP connection between your modem and the chosen ISP. A similar piece of software sets up the connection when you use AOL. See the instructions that come with AICK and AOL for more information.

What you can do on the Internet

The complexity of the Internet makes it possible to communicate across it in a variety of ways, including exchanging e-mail, teleconferencing, and retrieving files. Both AICK and AOL provide you with software required for some of these forms of communication. (For more information, refer to the manuals and online help for AICK and AOL.)

Browse the World Wide Web

The World Wide Web (also known as the *Web*) is the fastest growing part of the Internet. You view information on the Web by using software called a *Web browser.* You can view color images, animation, and video, and even hear sound. The "documents" that you view on the Web are known as *Web pages,* a collection of which is called a *Web site.* Web pages and sites contain links to other pages and sites. When you click a word or image that has been designated as a link, your browser automatically displays the contents of the linked page. Below is a portion of the "home page" of the Apple Computer Web site.

E-mail

You use electronic mail, or e-mail, to exchange information in much the same way that you use paper mail, except that e-mail is faster and more convenient. It is as easy to send a message to a single recipient as it is to send the same message to many recipients. You can also attach entire electronic files to e-mail.

Newsgroups

You can participate in "newsgroups"–worldwide public discussion groups for debating issues and for exchanging information. You can subscribe to a newsgroup for almost any topic imaginable, and you can read, respond to, and create your own messages, usually referred to as *articles.* Most newsgroups are unmoderated, which means that you can post your articles directly to the newsgroup. Other newsgroups are moderated, which means someone screens the articles and posts only those deemed appropriate for the newsgroup.

FTP

You can use File Transfer Protocol (FTP) software to transfer files to or from other computers on the Internet. Many specialized computers known as *servers* provide Internet users with files through FTP. FTP software comes in handy when you want to download (copy to your computer) software or software updates over the Internet.

Telnet

With Telnet software you can log onto other computers so that you can use their programs and data as if those items were on your own hard disk. Many libraries, for instance, have electronic (online) card catalogs that you can access by using Telnet software. There are a variety of other specialized databases that you can access through Telnet.

Chapter Six

Connecting Your Computer to a Network

Your Macintosh has a built-in LocalTalk networking port. LocalTalk is the name for a system of cables and connectors that connect your computer to printers, other computers, and other devices on a LocalTalk network.

If you purchased and installed an Ethernet card in your computer, you also have an Ethernet port for connecting to an Ethernet network.

This chapter describes how to connect and configure your computer on a LocalTalk or Ethernet network. If you do not plan to connect your computer to a LocalTalk or Ethernet network, you can skip this chapter.

A LocalTalk or Ethernet port lets you connect your computer to a *local area network.* A local area network consists of two or more computers, printers, file servers, and other devices connected by network cables. This is different from a *wide area network,* such as the Internet, where computers use modems to communicate with one another over the telephone lines.

A local area network allows you and the other people connected to it to share information and resources such as printers and modems. Your network may also provide services such as access to information databases and electronic mail.

Where to find more information

After you study the information in this manual, you'll want to consult other sources that give more details about your specific situation:

If your computer is already on a network

Refer to Mac OS Guide, available in the Guide (?) menu at the top-right corner of your screen. Mac OS Guide contains information about printing on a networked printer, accessing information on file servers, and sharing files on your computer with other users.

Ask your network administrator for information about network software that may be available, such as Internet access and electronic mail.

If you want to connect to an Ethernet network

You can have an Apple Ethernet CS II card installed by an Apple-authorized service provider or you can install it yourself. Before you purchase a card, be sure to find out what type of connector your Ethernet network requires—twisted pair (10Base-T), AAUI, or thin coaxial.

You can also have an expansion card installed that lets you connect to a Token Ring or ISDN network.

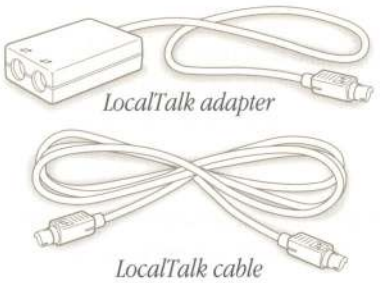
If you want to set up a new network

If your location does not currently have a network and you are interested in setting one up, you may want to use a book on Macintosh networking to help you select and plan a network that is appropriate for your organization. Many books about setting up a network are available at computer bookstores.

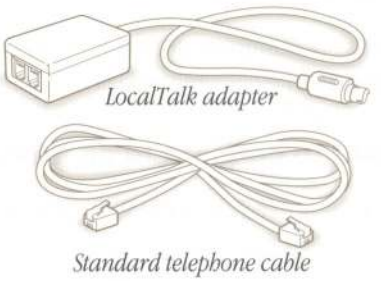
Connecting to a LocalTalk network

If your network uses standard LocalTalk cables, the Apple LocalTalk Locking Connector Kit DIN-8, available from your Apple-authorized dealer, contains the components you need to connect your Macintosh to an existing LocalTalk network. If your network uses standard telephone cables for your network wiring, obtain an Apple LocalTalk RJ-11 Connector instead.

Apple LocalTalk Locking Connector Kit DIN-8



Apple LocalTalk RJ-11 Connector



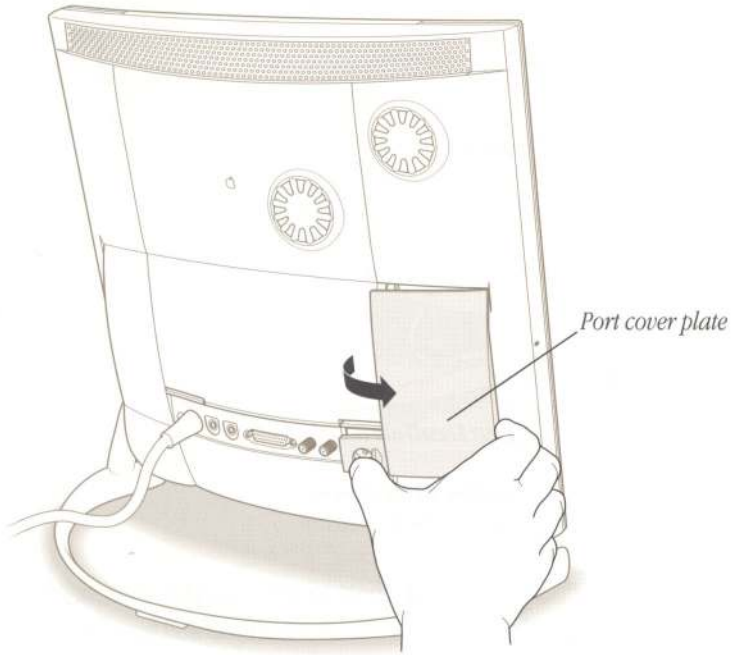
Note: At your location, there may be a network administrator who is responsible for network maintenance and upkeep. If so, ask your network administrator to help connect your computer to the network.

To connect your Macintosh to a LocalTalk network, do the following:

1 Shut down your Macintosh.

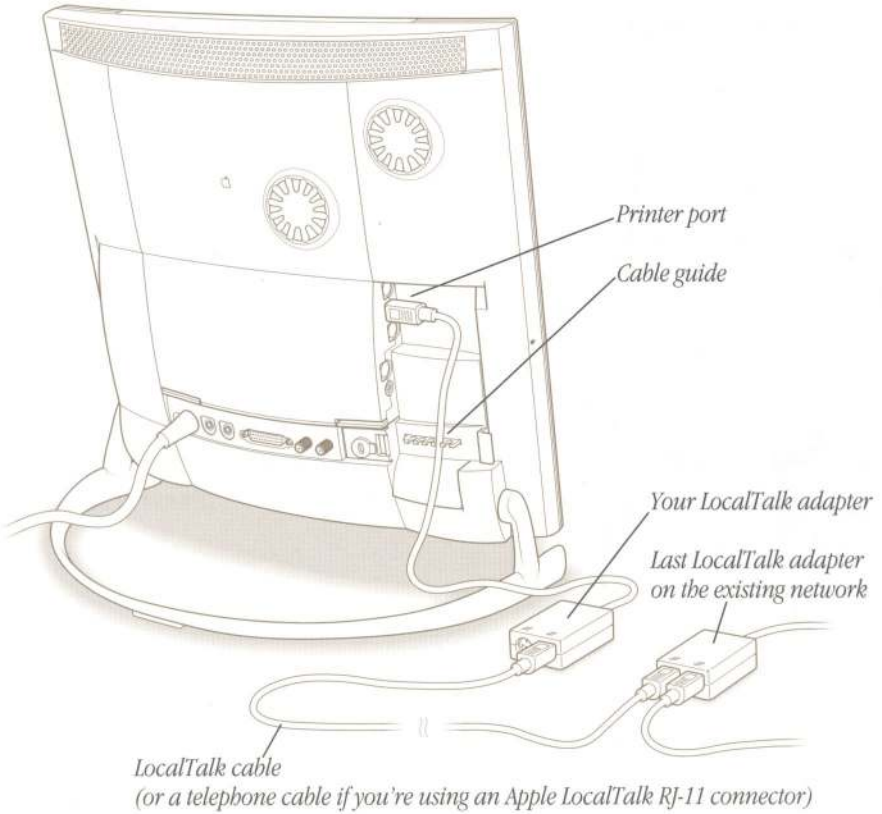
2 Remove the port cover plate from the back of the computer by squeezing it between your fingers and swinging it away from the computer.

Set the cover plate aside. (The cover plate is made up of two sections that can be easily separated and reassembled if needed.)



3 Attach the LocalTalk adapter to the printer port (marked with the icon) located behind the cover plate you removed, and press the cable into the cable guides. Then attach a network cable between the LocalTalk adapter connected to your computer and the last LocalTalk adapter on your existing network.

Use the LocalTalk cable that comes with the Apple LocalTalk Locking Connector Kit DIN-8. Or, if you are using the Apple LocalTalk RJ-11 Connector, use a standard telephone cable with RJ-11 connectors.



4 Put the port cover plate back on.

Next, see "Setting Up Your Network Connection" later in this chapter for information on configuring your LocalTalk connection.

Connecting to an Ethernet network

If you have installed an Apple Ethernet card in your Macintosh, follow the instructions in this section to connect to an Ethernet network.

At your location, there may be a network administrator who is responsible for network maintenance and upkeep. If so, ask your network administrator to help connect your computer to the network.

▲ **Warning** To avoid damaging your equipment, do not connect cables to the back of your computer when the computer is on. ▲

Identifying the Ethernet port on your computer

There are three types of Apple Ethernet cards:

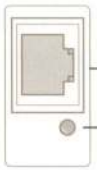
- Apple Ethernet CS II Twisted Pair
- Apple Ethernet CS II Thin Coax
- Apple Ethernet CS II AAUI

If you have an Ethernet card from a manufacturer other than Apple, refer to the manual that came with the card for instructions on making connections to the card.

Each type of card provides a different type of Ethernet port. You should have the type of card that provides the correct port for the Ethernet network you're connecting to. Depending on the type of card you have installed, you'll find one of these ports (in some cases, with a status light) on the back of your computer:

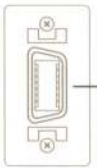
Thin coaxial Ethernet port (10Base-2)

Status light (lights up when there's a good network connection)



Twisted-pair Ethernet port (10Base-T)

Status light (lights up when there's a good network connection)



AAUI Ethernet port

Ethernet ports are usually marked with an Ethernet (⇔) icon.

Note: If the port isn't right for the network you're connecting to, you need to use an adapter cable (if possible) or switch to a different type of card that provides the correct port.

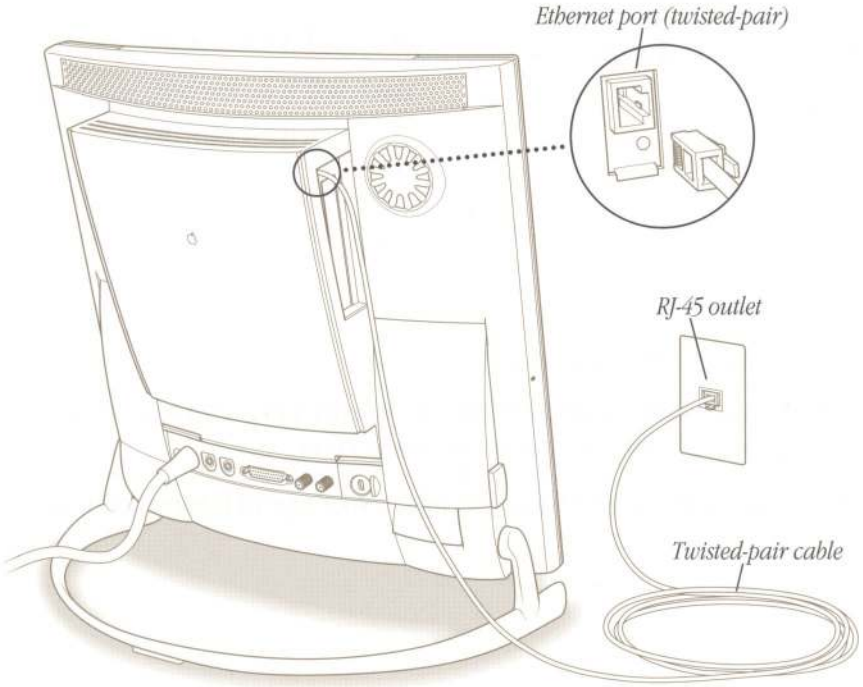
Follow the appropriate instructions in this section for connecting to your type of Ethernet network.

Connecting to a twisted-pair Ethernet network

To follow these instructions, you need a twisted-pair cable with an RJ-45 connector. The RJ-45 connector plugs into a wall plate that is connected to the 10Base-T network.

1. Shut down your computer.
2. Plug one end of a twisted-pair cable into the RJ-45 (10Base-T) Ethernet port on your computer.

   Just as when you plug in a standard telephone cable, you hear a click when you plug in the twisted-pair cable.
3. Plug the other end of the twisted-pair cable into an RJ-45 outlet that is connected to a twisted-pair Ethernet network.



4 Start up the computer.

Next, see "Setting Up Your Network Connection" later in this chapter for information on configuring your network connection.

Connecting to a thin coaxial Ethernet network

Important Connecting your computer to this kind of network will temporarily disrupt services to other users. To minimize the disruption, alert your network administrator before continuing these instructions.

To follow these instructions, you need a thin coaxial cable and the T-connector that came with your card. If you are adding your computer to the end of a network, you'll also need a thin coaxial Ethernet terminator.

1 Shut down your computer.

2 Attach one end of your thin coaxial cable to the T-connector that came with your card.

Don't attach the T-connector to your computer yet.

3 On the computer closest to your computer, detach the network cable (or terminator) from its T-connector.

This disrupts network service for other users.

Note: You can add a computer anywhere on the network.

4 Attach the free end of your thin coaxial cable to the T-connector on the other computer.

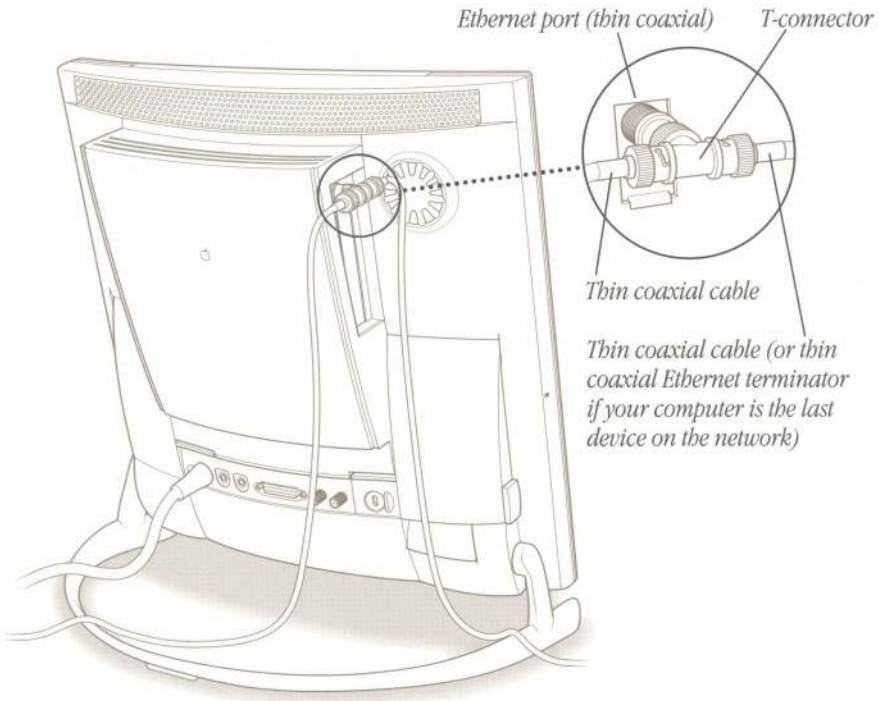
5 If you are adding your computer somewhere in the middle of the network, attach the unattached network cable to your T-connector. Otherwise, attach a terminator to your T-connector.

This restores network services for other users.

6 Attach your T-connector to the port on your card.

It may help to use two hands. With one hand, push the T-connector into the port. While still holding the T-connector, use the fingers on your other hand to twist and lock the connector into place.

Pull the T-connector to test whether it is locked securely onto the port.



7 Start up your computer.

Next, see "Setting Up Your Network Connection" later in this chapter for information on configuring your network connection.

Connecting to other types of Ethernet network

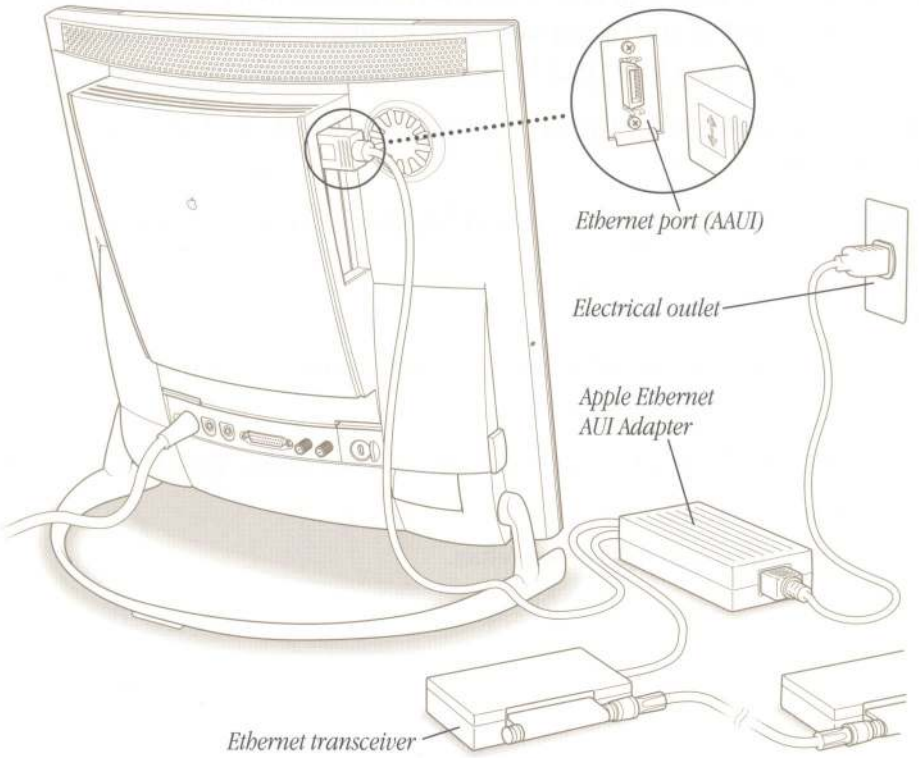
The Apple Ethernet AUI Adapter is a universal adapter that lets you connect your computer to less-common types of industry-standard Ethernet media such as thick coaxial or fiber-optic cable. The adapter connects both to the port on an Apple AAUI Ethernet card and to an electrical socket.

You also need an Ethernet transceiver for the type of cable your network uses. The transceiver must have a standard AUI port on it.

To connect your computer to your Ethernet transceiver and the Apple Ethernet AUI Adapter, follow these instructions:

1. Shut down your computer.
2. Connect the Ethernet transceiver to the network following the instructions that came with the transceiver.
3. Plug the transceiver cable from the Ethernet transceiver into the AUI port on the Apple Ethernet AUI Adapter.
4. Plug the adapter's power cord into an electrical power outlet.

5 Plug the connector on the Apple Ethernet AUI Adapter into the AAUI Ethernet port on your computer.



6 Start up your computer.

See the next section, "Setting Up Your Network Connection" for information on configuring your network connection.

Setting up your network connection

After you physically connect your computer to a LocalTalk or Ethernet network, you need to open the AppleTalk control panel, the TCP/IP control panel, or both, and specify the type of connection you want.

You use the AppleTalk control panel to set up your connection to an AppleTalk network. AppleTalk is networking software that provides a protocol (a standard set of rules) by which networks can function; it's built into all Macintosh computers. AppleTalk controls communications over a network so that messages are transmitted accurately and don't interfere with one another.

To communicate over a LocalTalk or Ethernet network, AppleTalk must be turned on.

You use the TCP/IP control panel to set up your connection to the Internet and to a TCP/IP network. TCP/IP stands for Transmission Control Protocol/Internet Protocol, a standard system for connections between computers of different types.

You may need additional information about the network to which your computer is connected, or about the service through which your computer is connected to the Internet. To get this information, you may need to contact your network administrator or your Internet service provider.

Setting up your AppleTalk network connection

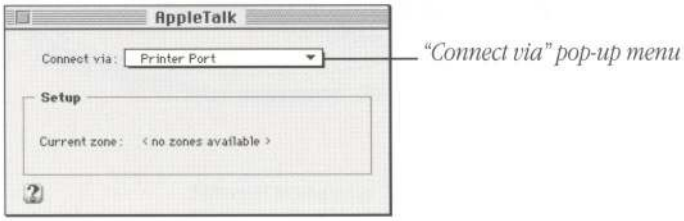
To set up your AppleTalk network connection, you must specify the port you use to connect your computer to the network.

Larger networks use zones to create logical groupings of computers, printers, servers, and other network devices. For example, a network might have a zone for each floor in a multistory office building. If your network has more than one zone, you can choose the zone in which your computer is located. The zone you choose should be the zone that is automatically selected in the Chooser (for example, when you select a network printer) and the zone in which other network users can find your computer if you turn on file sharing.

To set up your AppleTalk network connection, follow these instructions:

1. Choose Control Panels from the Apple (🍎) menu.
2. Double-click the AppleTalk icon to open it.

   The AppleTalk control panel opens.



3 Use the "Connect via" pop-up menu (if it's available) to choose the port through which your computer is connected to the network.

If you want to connect to a LocalTalk network, choose the port to which you attached your LocalTalk adapter (in most cases, the printer port). If you want to connect to an Ethernet network, choose Ethernet.

If you have installed an expansion card that supplies an additional port, the port will appear automatically in the "Connect via" pop-up menu.

Note: If you don't see a pop-up menu in the AppleTalk control panel, this setting has been locked. Contact your network administrator for assistance. (If you don't have a network administrator, you can use the Administration user mode to unlock this setting. For more information about user modes, click the ⍰ button in the AppleTalk control panel.)

4 Use the "Current zone" pop-up menu (if it's available) to choose the zone you want.

If you don't see a pop-up menu here, this setting has been locked or no zones have been set up. (If your network has a network administrator, that person sets up zones. Some networks don't need zones.)

5 Click the close box to close the AppleTalk control panel.

If you have made changes in the control panel, an alert box asks if you want to save them. If you have changed the port you are connecting through, an alert box also tells you that the change will interrupt AppleTalk services temporarily. This means that your network services such as printing and electronic mail may be temporarily unavailable, and you may have to choose a printer and reconnect to your e-mail service again after saving changes.

6 To save your changes, click the Save button.

Your changes take effect immediately; you do not have to restart your computer.

Getting more information about the AppleTalk control panel

Mac OS Guide contains information about additional capabilities available in the AppleTalk control panel, such as

- using configurations to save different AppleTalk settings and switch among them as desired—for example, if you use your computer with more than one network
- using the User Mode command to change the availability of settings in the AppleTalk control panel
- turning AppleTalk off when you are not using an AppleTalk network, to save RAM in your computer

For more information about these capabilities, click the ⍰ button in the AppleTalk control panel.

Configuring your TCP/IP network connection

This section pertains to computers that are on a local area network that uses the AppleTalk network protocol, such as a LocalTalk or Ethernet network. The instructions in this section explain how to use the TCP/IP control panel to set up your computer for connecting to the Internet (or other network that uses TCP/IP standards).

Note: If you wish to connect to the Internet but your computer is not on a local area network, you need the Apple Internet Connection Kit or an online service such as America Online. See Chapter 5 for more information.

What is TCP/IP?

TCP/IP (Transmission Control Protocol/Internet Protocol) is a standard set of rules (or protocol) for making connections among different types of computers. TCP/IP protocol can be used with many different types of network hardware and connectors, including LocalTalk, Ethernet, and Internet connections. If you don't know whether your network uses TCP/IP, contact your network administrator.

To set up your TCP/IP network connection, you must specify the port you use to connect your computer to the network. TCP/IP networks also require information about your computer's network address. You must enter that information in the control panel, or specify a server on which the information can be found.

Before you begin

To use a TCP/IP network, your computer must have an IP (Internet Protocol) address, and it often must have a subnet mask number. Your network address and subnet mask number identify your computer's location on the network. This information can be entered manually or obtained automatically from a server. Before you set up your TCP/IP network connection, obtain your IP address and subnet mask number from your Internet service provider or network administrator. If these can be obtained automatically from a server, find out whether the server is a "BootP," "RARP," "DHCP," or "MacIP" server.

BootP stands for Boot Protocol. A BootP server can automatically provide all the TCP/IP setup information you need.

RARP stands for Reverse Address Resolution Protocol. A RARP server can provide the IP address for your computer, but you must provide the rest of the information manually.

DHCP stands for Dynamic Host Configuration Protocol. A DHCP server can automatically provide all the TCP/IP setup information you need.

MacIP stands for Macintosh Internet Protocol. MacIP is both a type of server and a protocol for sending Internet-type packets of information over an AppleTalk network. A MacIP server can provide all the TCP/IP setup information you need, but you need to specify the zone where the MacIP server is located.

Setting up

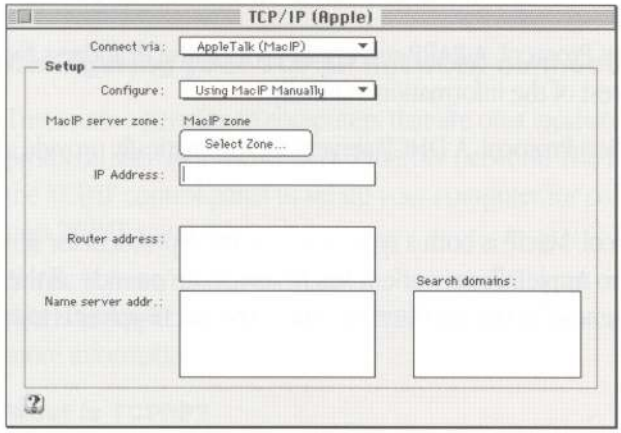
To set up your TCP/IP network connection, follow these instructions:

1 Choose Control Panels from the Apple (🍎) menu.

The Control Panels window opens.

2 Double-click the TCP/IP icon to open it.

The TCP/IP control panel for Apple computers opens.



Depending on your choices in the pop-up menus, your control panel may look different from this.

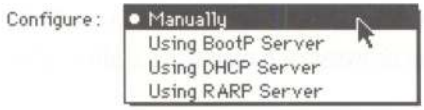
3 Use the "Connect via" pop-up menu to choose the port through which your computer is connected to the network.

If you want to connect through a LocalTalk network, choose the port to which you attached your LocalTalk adapter (in most cases, the printer port). If you want to connect through an Ethernet network, choose Ethernet.

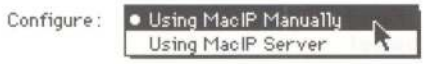
Note: If you don't see the "Connect via" pop-up menu here or other settings described in this section, they may have been locked. Contact your network administrator for assistance. (If you don't have a network administrator, you can use the Administration user mode to unlock this setting. For more information about user modes, click the ⍰ button in the TCP/IP control panel.)

4 Use the Configure pop-up menu to choose a configuration method.

If you are on an Ethernet network, the pop-up menu looks like this:



If you are on a LocalTalk network, the pop-up menu looks like this:



What you do next depends on whether you are configuring your network manually or automatically.

5 If you are configuring your network connection manually, type the information provided by your network administrator or Internet service provider into the appropriate boxes and then go on to step 7.

You must specify an IP address. You may also need to enter a subnet mask number, router address, and other information.

6 If you are configuring your network connection automatically, the information appears partially or entirely in the control panel. Do one of the following:

- If you are using a BootP server or DHCP server, go on to step 7. The server usually provides all the configuration information needed by TCP/IP. If the server doesn't provide the information, consult the person who maintains the server.
- If you are using a RARP server, you may need to type additional information provided by your network administrator or Internet service provider into the appropriate boxes. If so, enter the information now.
- If you are using a MacIP server, click Select Zone. In the dialog box that appears, choose the zone that contains the MacIP server you want to use and then click OK.

7 Click the close box to close the TCP/IP control panel.

If you have made configuration changes, an alert box asks if you want to save changes. If you have changed the port, an alert box also tells you that the change will interrupt any connections to TCP/IP services. For example, you may have to quit and reopen a Web browser or e-mail service after saving changes to the TCP/IP control panel.

8 To save your changes, click the Save button.

Your changes take effect immediately; you do not have to restart your computer.

Getting more information about the TCP/IP control panel

Mac OS Guide contains information about additional capabilities available in the TCP/IP control panel, such as the following:

- using configurations to save different AppleTalk settings and switch among them as desired—for example, if you use your computer with more than one network
- using the User Mode command to change the availability of settings in the AppleTalk control panel
- turning AppleTalk off when you are not using an AppleTalk network, to save RAM in your computer

For more information about these capabilities, click the ⍰ button in the TCP/IP control panel.

Part Three

Multimedia

Chapter Seven

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Sound

There are several ways that you can enjoy your computer's special sound system: you can play music on audio CDs in the CD-ROM drive, listen to sounds from multimedia files, tune into FM radio stations with the built-in FM tuner, or connect any sound source to the computer's sound input port and play the sounds through the computer's sound system.

This chapter explains how to

- play an audio or multimedia CD in the CD-ROM drive
- attach an FM antenna and tune in FM radio
- connect audio equipment, such as a tape player or headphones, and set up your equipment to record sound
- use the computer's built-in microphone
- adjust settings for the sound system

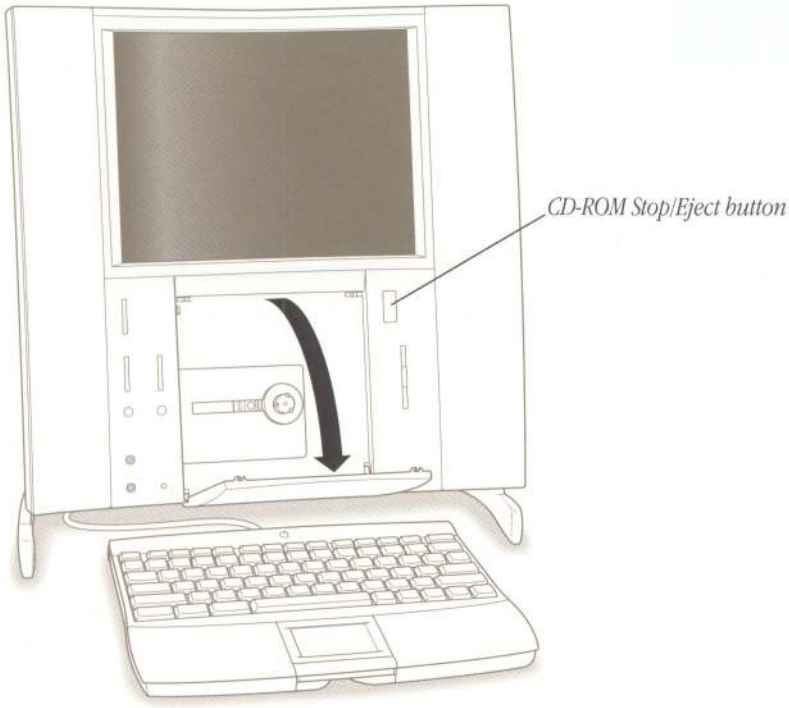
Sound settings related to working with video equipment and watching TV on your computer are covered in Chapter 8, "Video."

Playing an audio or multimedia CD

You can play sounds from a standard audio CD or a multimedia CD-ROM disc through the computer's sound system. Follow these instructions:

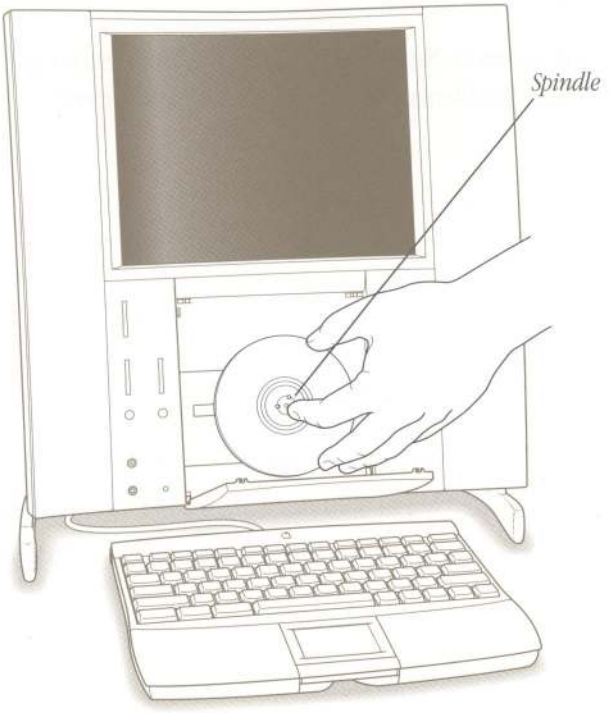
1 Open the CD-ROM drive door by pressing the Stop/Eject button.

The door opens automatically when you press the button. Never pry or pull the door open. If the door doesn't open when you press the button, see "Problems With CD-ROM Discs and Drives" in Chapter 12.



2 Press the center of the disc onto the CD-ROM drive's spindle, label side out.

Center the disk in the drive, handling the disc by its edges, then press on the center of the disc (near the hole) to be sure that the disc is firmly in place.



3 Close the CD-ROM drive door.

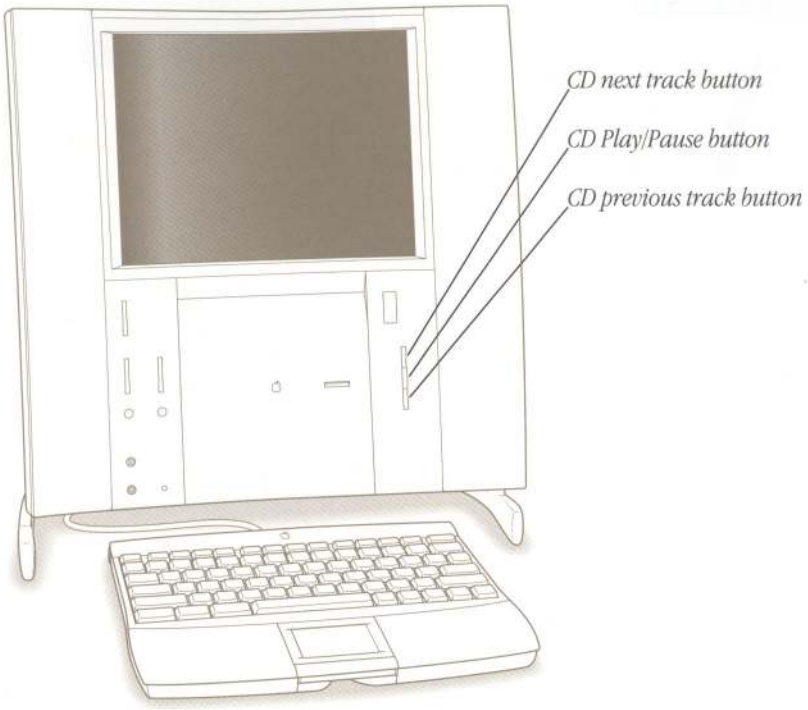
Make sure the door is completely closed on both the left and right side.

4 What you do next depends on the type of CD you're playing:

- If the disc is an audio CD, open the Apple (🍎) menu and choose AppleCD Audio Player. For help while using the AppleCD Audio Player, open the Guide (?) menu and choose AppleCD Audio Player Guide, or turn on balloons.

  You can also use the buttons on the computer next to the CD-ROM drive to play CDs and change tracks.

- If the disc is a multimedia CD, refer to the information that came with the CD, or information on the CD itself, for help while using it.



You may need to adjust the sound volume or change the settings in the Monitors & Sound control panel. For instructions, see "Adjusting the Sound Settings," later in this chapter.

Turning off "autoplay"

Your computer may be set to play an audio CD automatically as soon as you put it in the CD-ROM drive. If you don't want a CD to play automatically, follow these steps:

1 Open the Apple (🍎) menu and choose Control Panels.

2 Open the QuickTime Settings control panel

3 Click to remove the X from the Autoplay checkbox.

Listening to FM radio

Your computer comes with the Apple TV/FM Radio System card preinstalled. This card lets you tune in FM radio signals and play them through the computer's speakers.

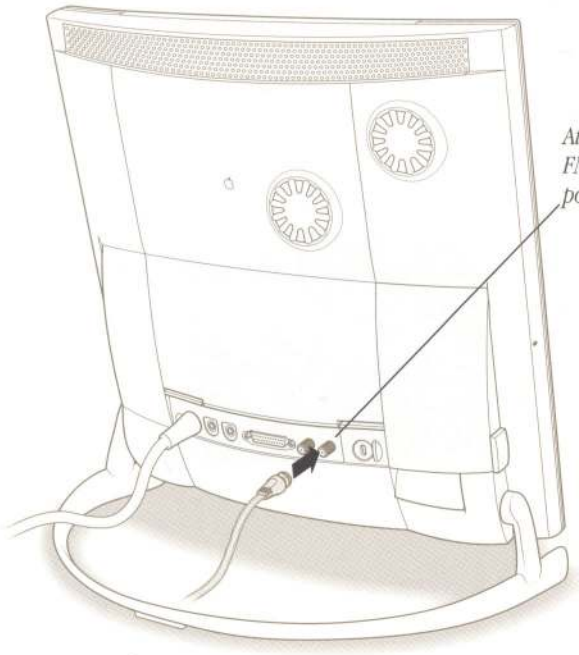
Connecting an FM antenna

Before you can tune in FM radio stations, you must attach the FM antenna that came with the computer. Follow these instructions:

1 Shut down the computer.

2 Attach the FM antenna to the FM port—the port on the right, marked by the icon.

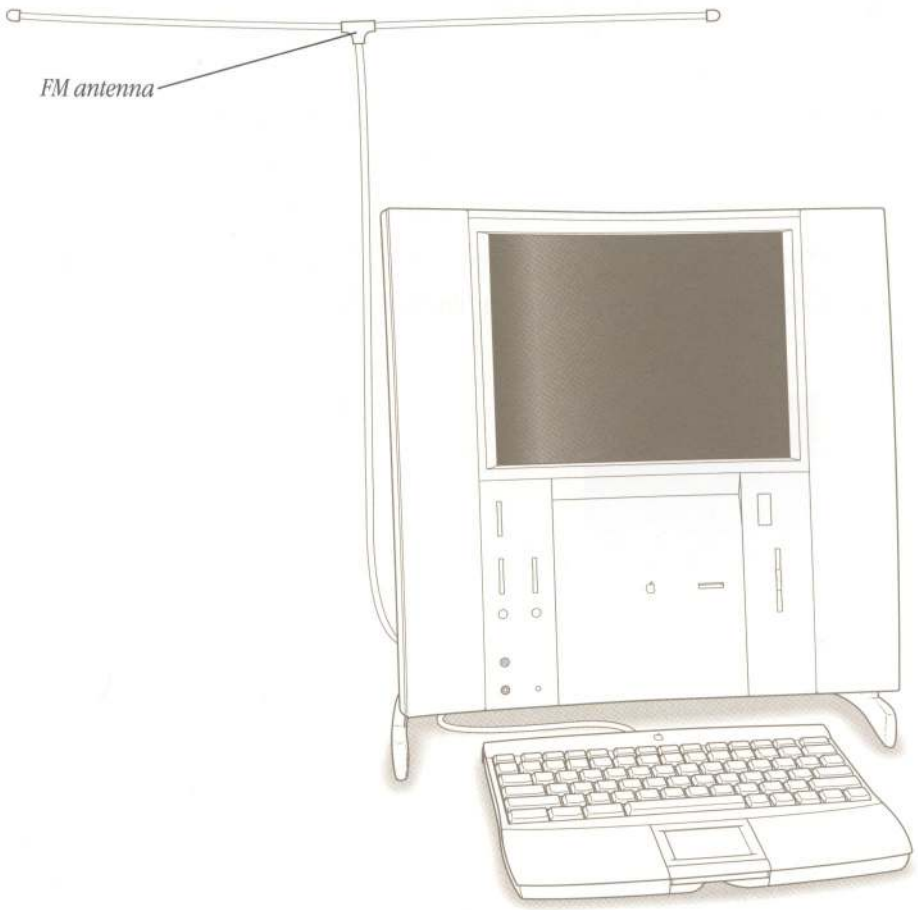
Depending on the type of antenna that came with your computer, you may have to either push or screw the connector into the FM port.



Attach the FM antenna to the FM tuner port. The FM tuner port is marked with the icon.

3 Unfold the FM antenna and position it high for the best reception.

Attach the antenna to a wall in the position that gives the clearest reception. Use tape, thumbtacks or pushpins (through the middle of the plastic strips or the white plastic ends).



4 Restart the computer.

Tuning in a station

Be sure you have attached the FM antenna to your computer, following the steps in the previous section. To begin listening follow these instructions:

1 Open the Apple (🍎) menu and choose Apple FM Radio.

You may hear only static until you tune in a clear station.

You use Apple FM Radio to select stations and make other changes. For help while using Apple FM Radio, open the Guide (?) menu and choose Apple FM Radio Guide or choose Show Balloons.

You may need to adjust the sound volume or change the settings in the Monitors & Sound control panel. For instructions, see "Adjusting the Sound Settings" later in this chapter.

If you do not hear the radio right away, see the section "Problems Listening to the Radio," in Chapter 12.

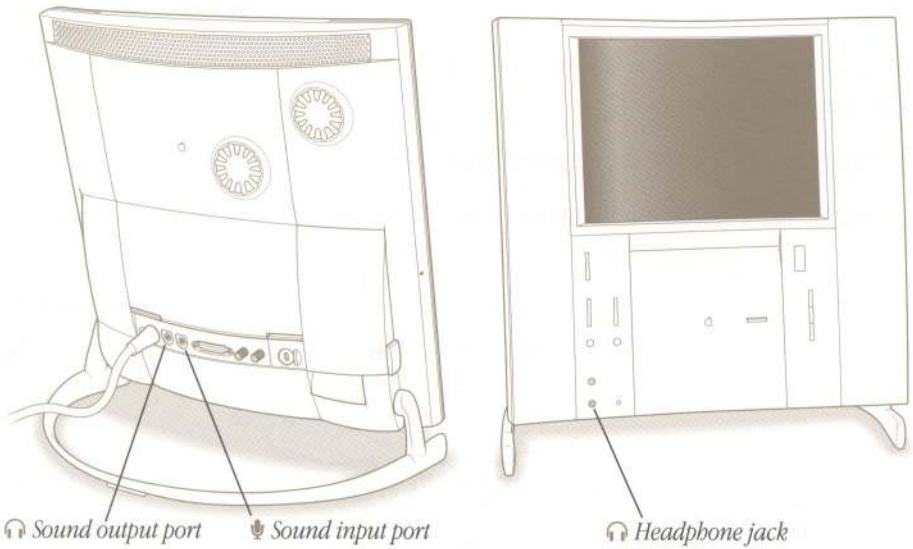
Connecting audio equipment

Your computer can record stereo sound from a sound input device—also called a *sound source*—such as an extra microphone, a tape deck, or an audio CD player. Your computer can also play audio CDs in its internal CD-ROM drive. The term *sound input device* means a device whose sound goes into your computer for you to record or process in various ways.

You attach sound input devices to the sound input port on the back of your computer. The port is marked with an icon of a microphone (🎙).

Your computer comes with a built-in sound system, but you can attach an additional sound output device, such as a set of amplified speakers or a set of headphones.

Sound output devices can be attached to either of the sound output ports. Both ports are marked with an icon of headphones (🎧).



You need a cable with one of the 3.5-mm audio connectors shown below to connect equipment to your computer's sound input port. You need a cable with a stereo miniplug to connect speakers or other equipment to the sound output port.

Stereo miniplug

Extended miniplug

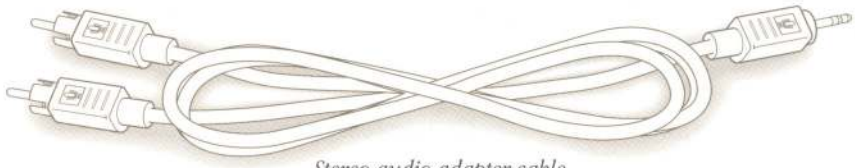
The stereo miniplug is the smaller of the two and is found most often on stereo equipment. The extended miniplug, which is slightly longer and comes with voice quality external microphones (such as the Apple PlainTalk Microphone), works only in your computer's sound input port (🎙).

To connect most audio equipment, follow the steps below. If you are connecting a VCR or a camcorder and its microphone, see Chapter 8.

1 Check to see what type of connector your equipment's cable has.

If your equipment's cable has a stereo miniplug or extended miniplug like the ones pictured above, go on to step 2.

If your equipment has two cables with left and right RCA-type connectors, attach the equipment to the stereo audio adapter cable that came with your computer.



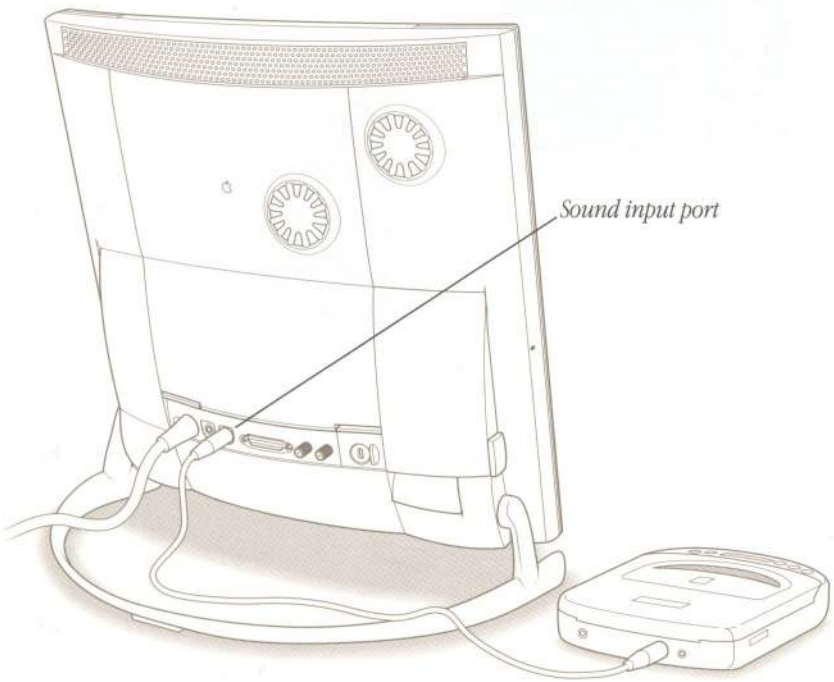
Stereo audio adapter cable

2 Place the audio equipment near the computer.

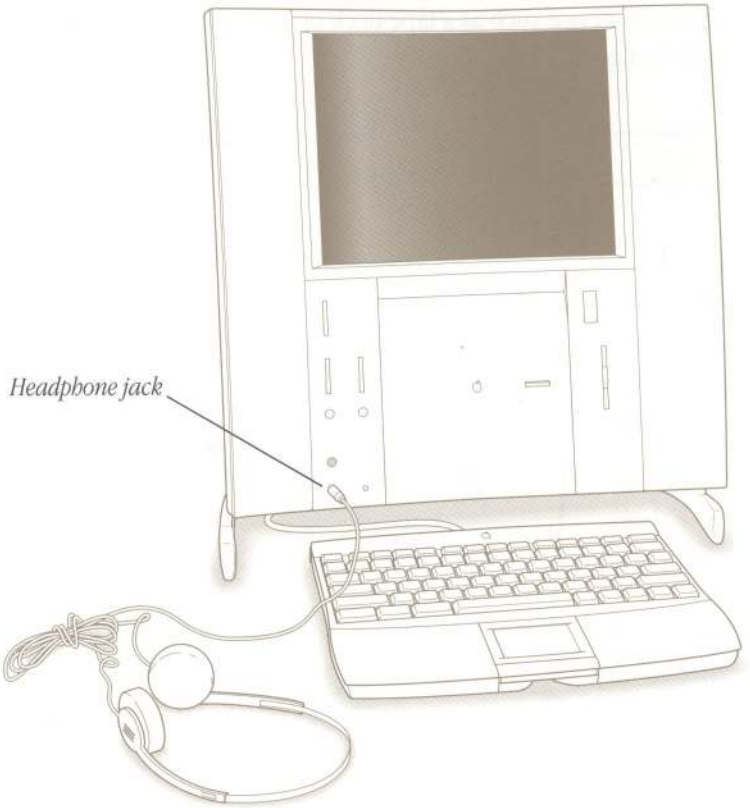
3 Attach cables to the audio equipment following the instructions that came with the equipment.

Some equipment (such as most headphones) comes with cables already attached.

4 If your audio equipment is a sound input device such as a tape deck or an audio CD player, attach its cables to the sound input port, and then go on to step 6.



5 If your audio equipment is a sound output device such as headphones or amplified speakers, attach its cables to one of the sound output ports.



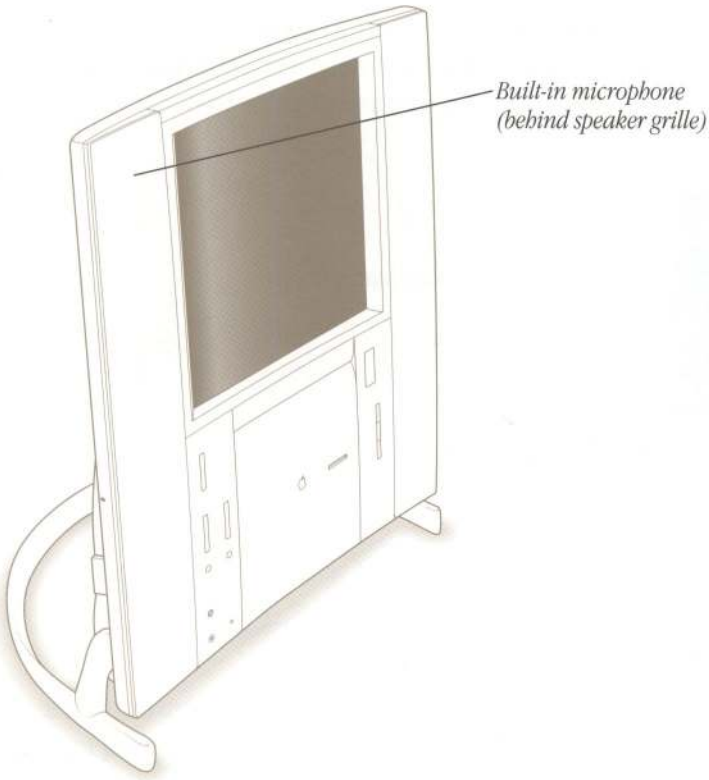
6 Turn on the audio equipment.

Follow the instructions that came with your equipment.

You may need to adjust the speaker volume or change the settings in the Monitors & Sound control panel. For instructions, see "Adjusting the Sound Settings," later in this chapter.

Using the built-in microphone

Your computer comes with a built-in microphone for recording live sounds. The microphone is highly sensitive. Once you've turned it on (which you do with a sound-recording application program), it can pick up sounds within a range of several feet. For instructions on selecting the microphone as the sound source for recording, see "Adjusting the Sound Settings," later in this chapter.



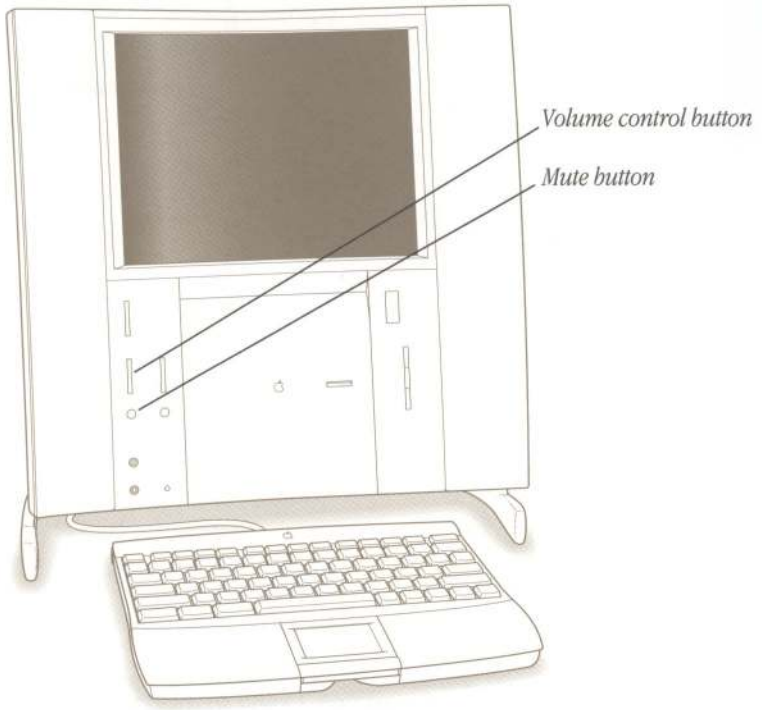
▲ **Warning** Do not stick any small objects into the built-in microphone. Doing so may damage your equipment. ▲

Adjusting the sound settings

After you begin playing music, multimedia, or other sounds through your computer's sound system, you may want to adjust the sound system volume or the bass unit's level. Before you can record sound, you may need to specify which device you want as your sound source.

Adjusting the speakers

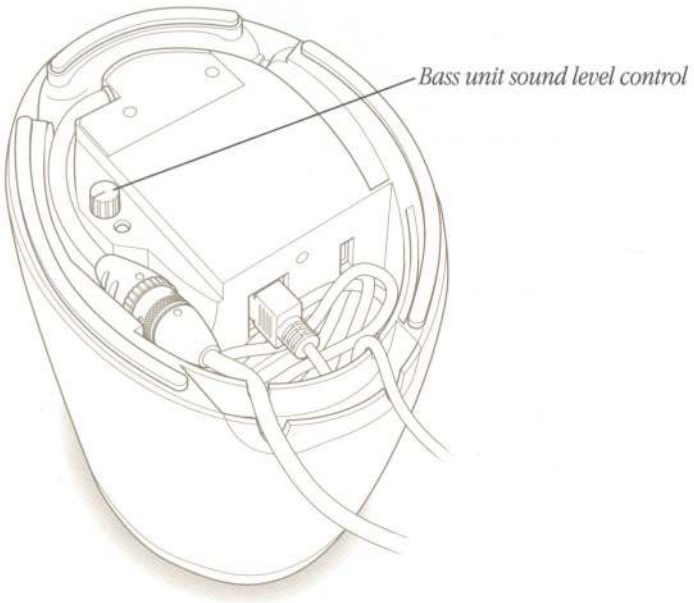
To adjust the volume for the sound system, press the volume control button shown in the illustration. (You can also use the volume buttons on the remote control that came with your computer.) This changes the volume of the speakers on either side of the screen as well as the bass unit volume.



Adjusting the level of the bass unit

The bass unit sound level is preset at the factory to be appropriate for most conditions. However, if you place the bass unit near a corner, you may want to turn down the bass unit level. If you place the bass unit away from all walls or up off the floor, you may want to turn up the level.

To adjust the bass unit level, use the control that's in the well underneath the bass unit. (If you turn the level all the way down, you won't hear any bass.)



Once the bass unit level is set, the overall sound system volume is adjusted using the volume button on the front panel or the remote control.

Specifying a sound source for recording

You use the Monitors & Sound control panel to specify a sound source for recording. Follow these instructions:

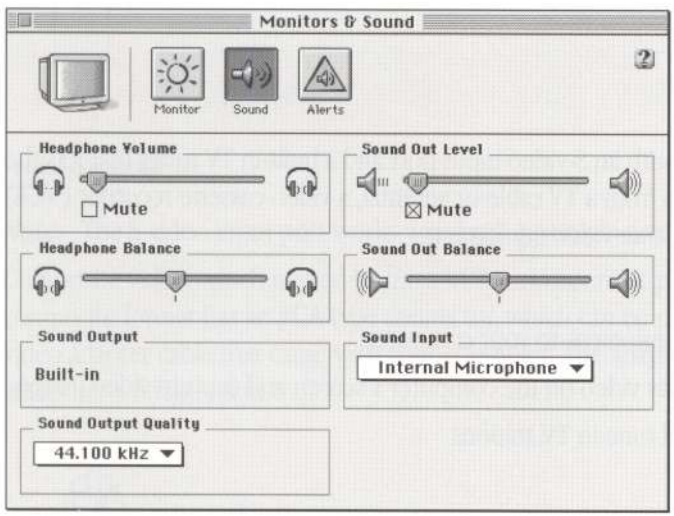
1. Open the Apple (🍎) menu in the upper-left corner of your screen, and choose Control Panels.
2. Double-click the Monitors & Sound control panel to open it.

   The next page shows an example of the Monitors & Sound control panel. The control panel may look slightly different on your computer.

3. Click the Sound icon at the top of the Monitors & Sound control panel.

4 Choose the sound input device you want to use from the Sound Input pop-up menu.

- To use the computer's microphone, choose Internal Microphone.
- To use a device connected to the sound input (🎙) port, choose External Microphone (even if the device is not a microphone).
- To use the FM antenna, choose CD/TV/Video.



For more instructions, click the Guide (?) button in the upper-right corner of the control panel.

Chapter Eight

Video

Your computer comes equipped with an S-video input port and a built-in TV tuner that lets the computer receive and display video from a TV cable or antenna, a video cassette recorder (VCR), a laserdisc player, a camcorder, or other video equipment.

This chapter explains how to

- connect a camcorder or other equipment to your computer
- play a video recording and display video on the computer's screen and capture video images
- attach a TV cable or antenna and tune in TV stations

Connecting video input equipment

You can connect video equipment to the S-video port on your computer so you can view video, capture video images, and hear the sound from the video equipment through the computer's speakers.

Your Macintosh works with either of two standard video formats:

- S-video, which is a high-quality video format used by many video cameras, some VCRs, and most televisions. Equipment that uses the S-video format has an S-video connector, which can be plugged directly into the computer's S-video input port:

S-video connector

Note: The S-video input port works with both seven-pin and four-pin S-video connectors.

- Composite video, which is used by most VCRs and laserdisc players. Equipment that uses the composite format has an RCA-type connector, which can be plugged into the composite video to S-video adapter cable that came with your computer. The adapter cable then plugs into the computer's S-video port.

RCA-type connector

RCA plug *S-video plug*

The instructions that follow are for connecting any video input equipment although they use a stereo VCR and a camcorder as examples.

Preparing your equipment and assembling cables

1. Make sure that the video equipment you want to connect has either an RCA-type video port or an S-video port.
2. Place the equipment near the Macintosh.
3. Make sure you have the cable you need to connect the equipment to the Macintosh. The cable you need depends on what kind of port your equipment has.
   - If your equipment has an RCA-type video port, you'll need the composite video to S-video adapter cable that came with your computer.

   - If your equipment has an S-video port, you'll need a cable with S-video connectors at each end. If your equipment didn't come with this type of cable, you can purchase one at an electronics store.

4 Assemble the audio cables you need to connect the equipment to the Macintosh.

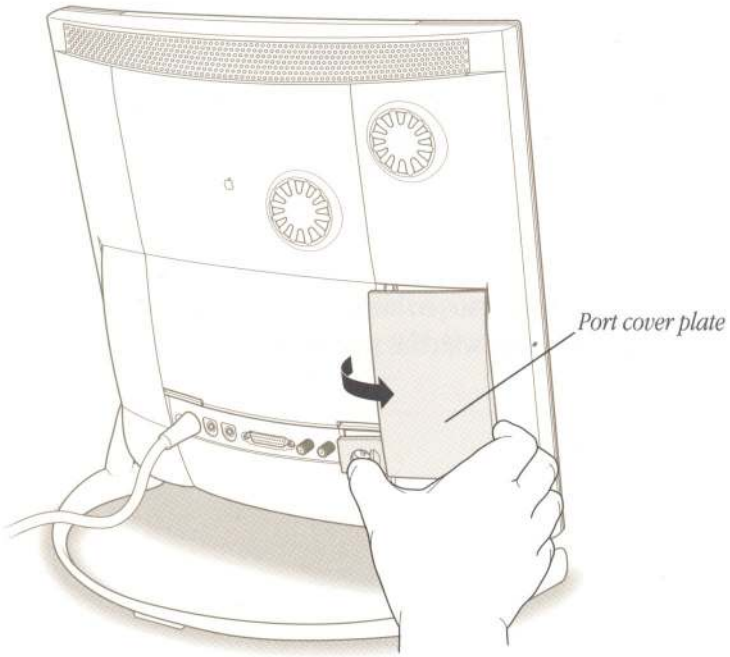
- If your equipment has left and right Audio Out ports that accept RCA-type connectors, you'll need the stereo audio adapter cable that came with your computer.

- If your equipment has a single monaural Audio Out port that accepts an RCA-type connector, you'll need the mono audio adapter cable that came with your computer.

- If your equipment has an Audio Out port that accepts a stereo miniplug, you'll need a cable with miniplugs at both ends. If your equipment didn't come with this type of cable, you can purchase one at an electronics store.

5 Remove the port cover plate from the back of the computer by squeezing it between your fingers and swinging it away from the computer.

Set the cover plate aside. (The cover plate is made up of two sections that can be easily separated and reassembled if needed.)



The port cover plate covers the ports for connecting a modem, keyboard, printer, and video equipment (such as a video cassette recorder or camcorder).

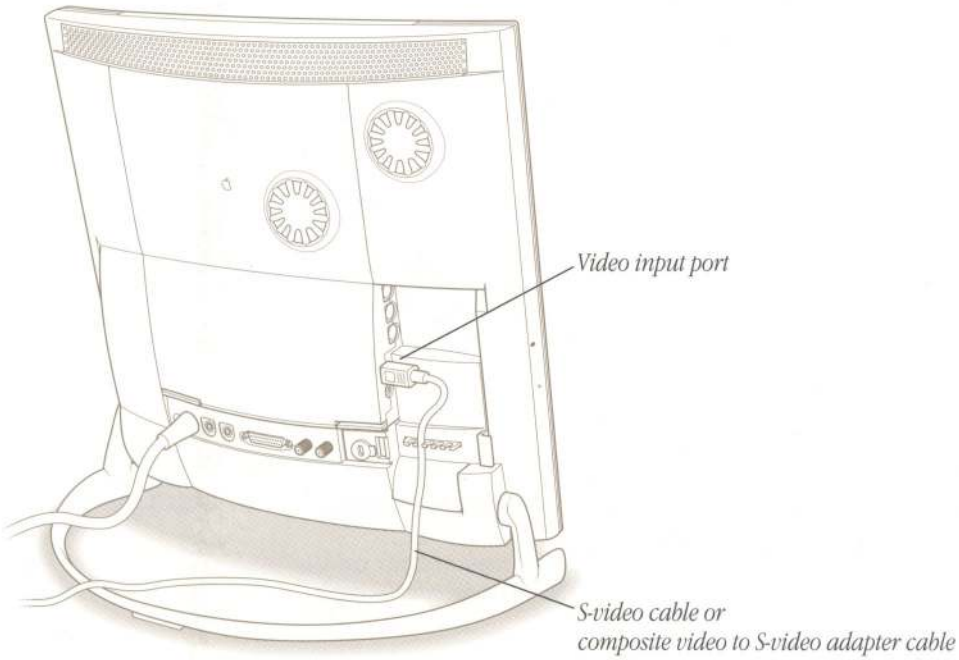
Connecting the equipment to the computer

1 Attach one end of the video cable to the Video Out port on the video equipment.

Follow the directions that came with the VCR or camcorder.

2 Plug the other end of the video cable (or adapter cable) into the S-video input port (S IN) on the computer.

If the connector doesn't slide easily into the port, check the pin alignment and try again. Don't use force, which could damage the computer or cable.



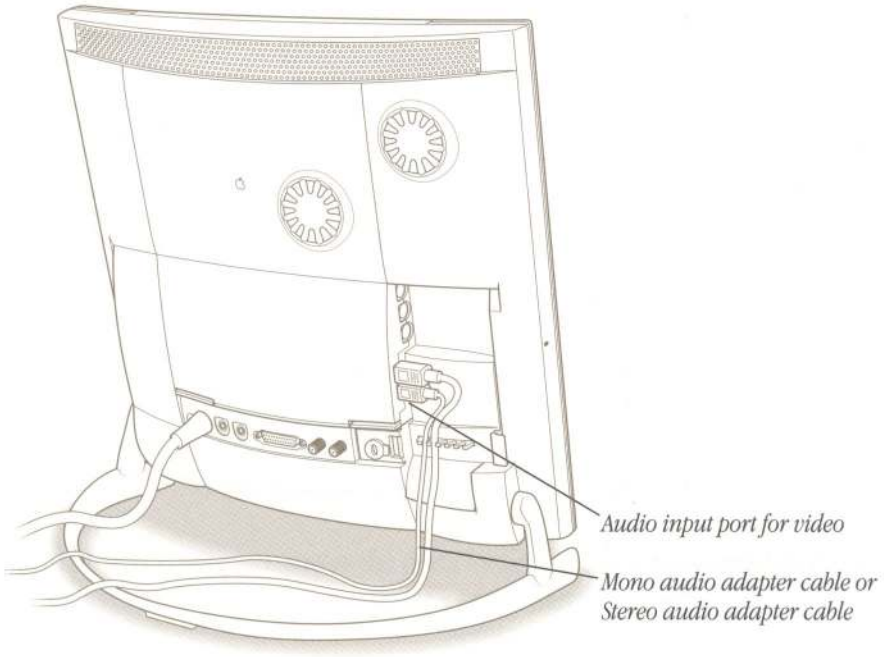
Important The S-video connector is a round plug with several small metal pins, which resembles other Macintosh connectors, such as those for a printer, modem, mouse, or keyboard. Don't confuse the connectors; they're not interchangeable.

3 Plug one end of the audio cable (or adapter cable) into the Audio Out port on the video equipment.

If the video equipment has left and right Audio Out ports for RCA-type connectors, plug in both the connectors of the stereo audio adapter cable.

4 Plug the miniplug connector on the audio cable (or adapter cable) into the sound input (🎤) port behind the port cover plate you removed.

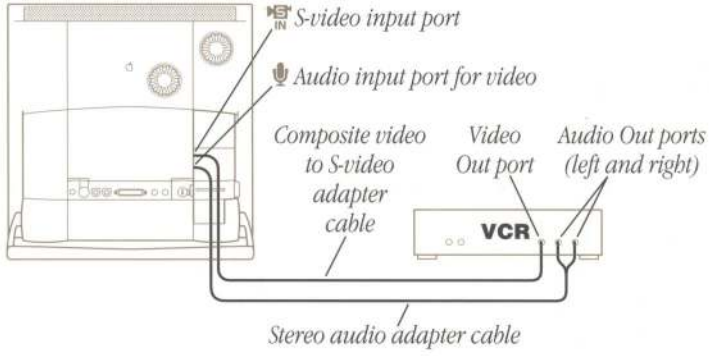
The computer has two ports marked with a (🎤). For audio input associated with video, be sure to use the one that had been covered by the port cover plate you removed.



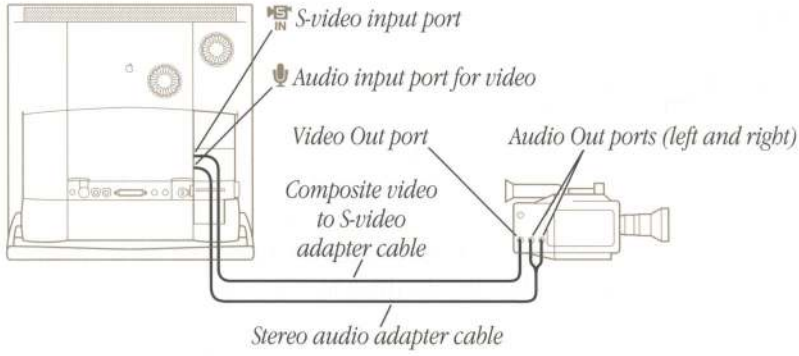
5 Replace the port cover plate.

The following illustrations show S-video connections and composite video connections for both a VCR and a camcorder. Your finished connections should look something like one of the illustrations on the following pages.

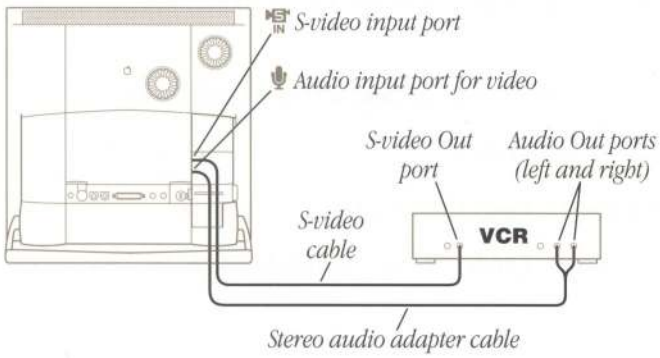
Connection for input from a VCR (composite connection)



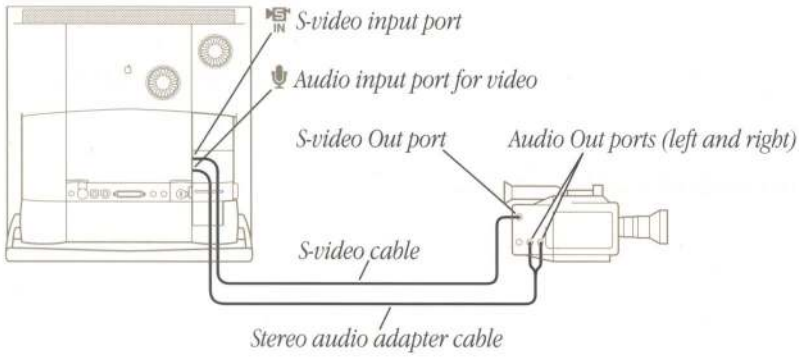
Connection for input from a camcorder (composite connection)



Connection for input from a VCR (S-video connection)



Connection for input from a camcorder (S-video connection)



Working with video on your computer

After you connect a VCR, camcorder, or other video equipment to your computer, you can begin working with it.

1. Turn on the video equipment, following the instructions that came with the equipment.
2. Open the Apple (🍎) menu and choose Apple Video Player.
3. Use Apple Video Player to play video and adjust settings from the video equipment.

   For help while using Apple Video Player, open the Guide (?) menu and choose Apple Video Player Guide, or choose Show Balloons.

   Note: The remote control has a TV/Mac button that lets you switch between Apple Video Player's video window and computer programs.

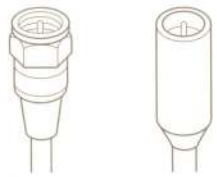
Watching TV

Your computer comes with an Apple TV/FM tuner card pre-installed. This card lets you watch TV on the computer's screen.

Connecting to an antenna or cable service

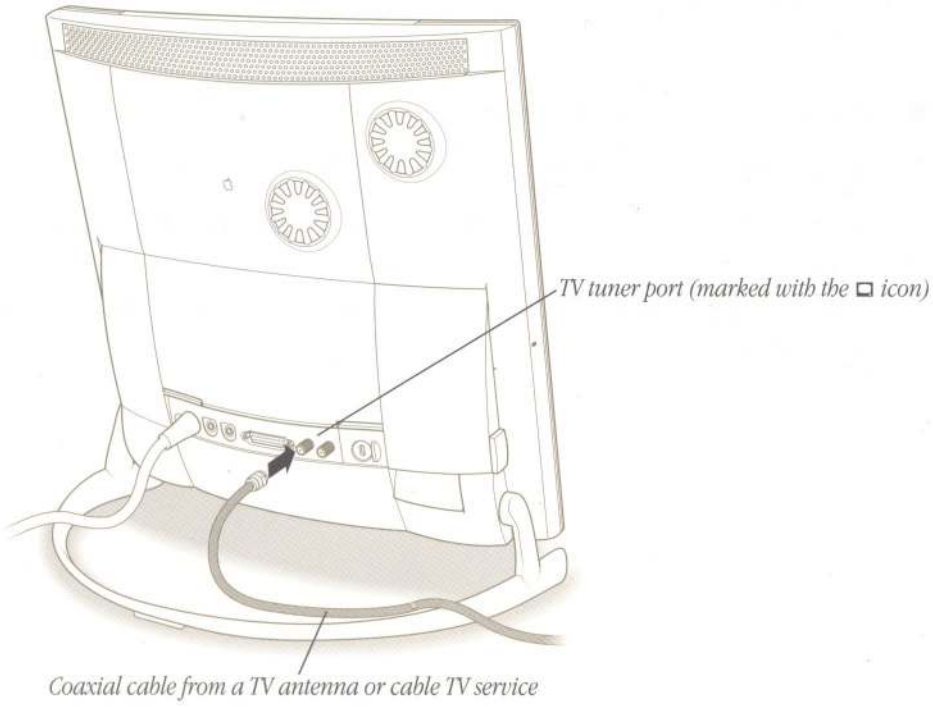
To tune in TV stations, you must attach a cable from a TV antenna or a cable TV service. Follow these instructions:

1. Shut down the computer.
2. Before you attach the cable, make sure it has an F-type coaxial cable connector.



F-type coaxial cable connectors

3 Connect the TV port on the left, marked by the ▭ icon, to a cable from a TV antenna or a cable TV service.



Tuning in a station

Be sure you have attached the cable to your computer, following the steps in the previous section. To begin watching TV, follow these instructions:

1. Turn on the computer.
2. Open the Apple (🍎) menu and choose Apple Video Player.
3. Use Apple Video Player to customize your settings and begin watching TV.

For help while using Apple Video Player, open the Guide (?) menu and choose Apple Video Player Guide, or choose Show Balloons.

Note: The remote control has a TV/Mac button that lets you switch between Apple Video Player's video window and computer programs.

Part Four

Expanding Your Computer's Capabilities

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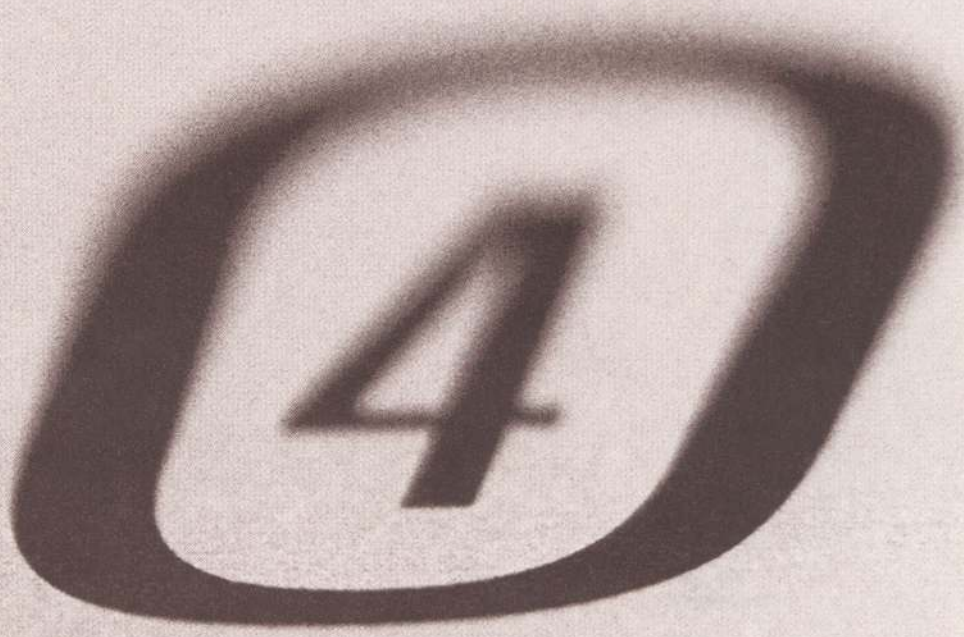
Installing Expansion Cards and Memory 158



Connecting Additional Equipment

You can expand your computer system by connecting equipment to it.

This chapter describes how to connect the following types of devices:

- external SCSI devices, such as a hard disk and a cartridge drive
- a printer
- additional ADB input devices, such as a mouse, trackball, or graphics tablet
- security equipment to protect your Macintosh

The illustrations on the next few pages show where equipment should be connected to your Macintosh.

The following chapters contain information on connecting other equipment:

Chapter 5: network connections

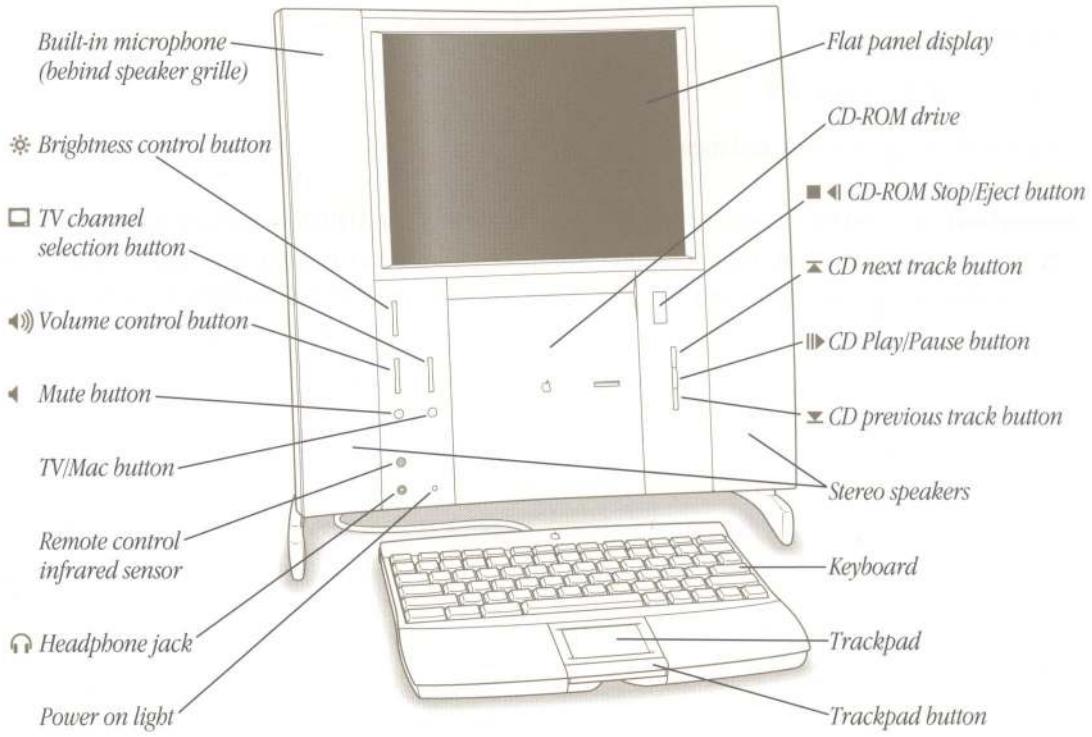
Chapter 7: audio equipment

Chapter 8: video equipment

Chapter 10: internal drives and memory upgrades

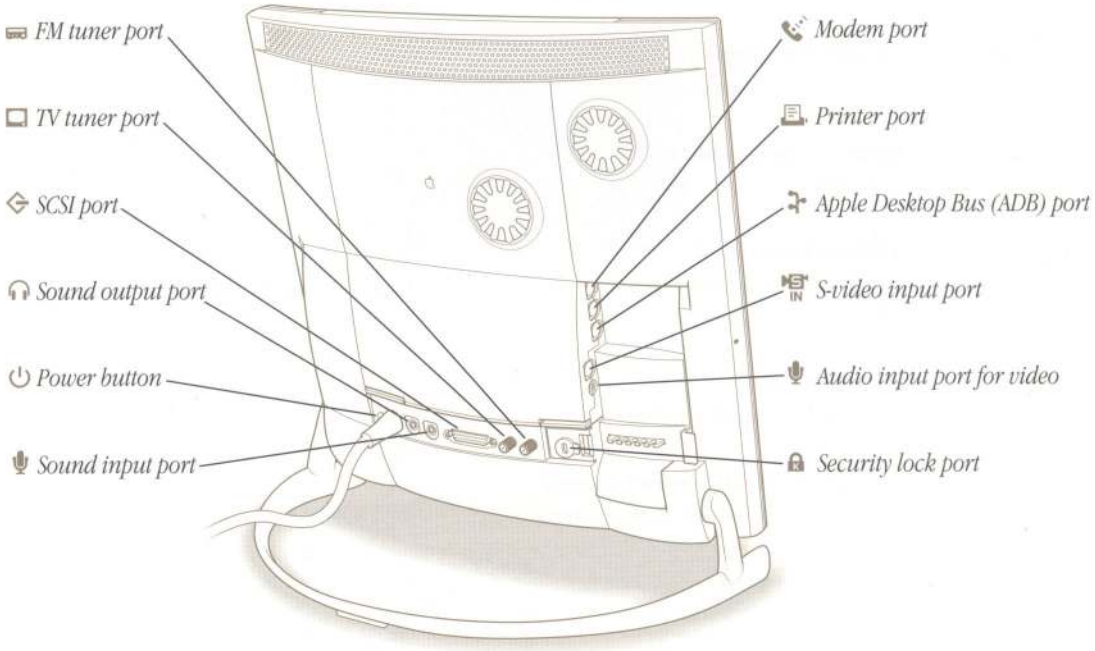
Important Turn off the computer before connecting a SCSI or ADB device. Each device you add needs to be compatible with your computer. For more information, consult an Apple-authorized dealer, the manufacturer of the equipment you add, or Appendix D, "Technical Information," at the end of this manual.

Your computer's components and front panel controls



	Brightness control button Controls the screen's backlighting to let you brighten or dim the screen.
	TV and FM channel selection button Lets you change channels when you're watching TV on the computer.
	Volume control button Controls the speaker volume.
	TV/Mac button Switches between displaying a video window (for watching TV programs or video recordings) or an application program's window in front.
	Mute button Turns the volume off temporarily.
	Remote control infrared sensor Receives signals from the remote control.
	Headphone jack Connects your Macintosh to stereo headphones.
	CD next track, Play/Pause, and previous track buttons Controls music and multimedia CDs in your CD-ROM drive.

Your computer's ports and power button



FM radio port
Connects your Macintosh to an FM radio antenna.

TV tuner port
Connects your Macintosh to a TV cable service or antenna.

SCSI port
Connects your Macintosh to SCSI equipment such as external hard disk drives and scanners.

Sound output port
Connects your Macintosh to headphones, externally powered (amplified) speakers, or other audio output equipment.

Sound input port
Connects your Macintosh to audio input equipment.

External modem port
Connects your Macintosh to a GeoPort Telecom Adapter, external modem, LocalTalk network, or printer.

Printer port
Connects your Macintosh to a printer, GeoPort Telecom Adapter, external modem, or LocalTalk network.

Apple Desktop Bus (ADB) port
Connects your Macintosh to an input device, such as a keyboard or a trackball.

Video input port
Connects your Macintosh to a VCR, laserdisc player, camcorder, or other video equipment.

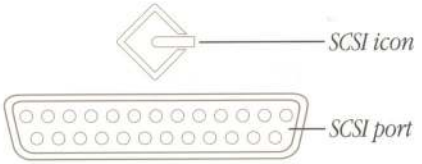
Audio input port for video
Connects your Macintosh to equipment for recording video and sound together.

Security lock port
Lets you attach a locking cable to your computer.

Connecting external SCSI devices

Your computer has a port for connecting devices that use the Small Computer System Interface (SCSI, pronounced "skuh-zee"). SCSI is a standard method for connecting disk and cartridge drives, CD-ROM drives, scanners, and other devices. The SCSI port permits high-speed communication between the computer and the device.

The SCSI icon appears above the port on the computer's back panel.



You can connect SCSI devices to the SCSI port in a chain-like fashion. The first device in the chain plugs into the SCSI port, the second device plugs into the first device, and so on.

You can attach up to six SCSI devices in the chain. Each device on the SCSI chain must have a unique ID number.

Before you connect a SCSI device

Before you connect a SCSI device to your Macintosh, be sure to complete the tasks explained in this section.

Important This section contains general instructions for attaching SCSI devices to your computer. Be sure also to follow the specific instructions that came with your external hard disk drive or other SCSI device when connecting the device to your Macintosh. The specific instructions that came with the device tell how to change a device's ID number and attach a SCSI cable or terminator to it.

Make sure each device has a unique ID number

Each external SCSI device connected to your computer must have its own, unique ID number from 0 to 6. (Do not assign SCSI ID number 3, because it is already taken by the built-in CD-ROM drive.) The SCSI ID number helps the computer keep track of the devices and sort out conflicts when more than one device in the SCSI chain is communicating with the computer simultaneously.

The SCSI devices can be in any physical order in the chain; it is not necessary to arrange them in numerical order.

See the instructions that came with each SCSI device for information on checking and setting its SCSI ID number.

Important If you use two or more devices attached to the same SCSI interface with the same ID number, your computer will not start up properly, your equipment could malfunction, and you could lose data as a result.

Make sure you use the right type and length of cable

To attach a SCSI device to your computer or to another device in the chain, always use SCSI cables that are double-shielded, such as Apple SCSI cables. Never use printer-type RS-232 cables (commonly used with DOS and Windows computers). Poor quality SCSI cables are often the cause of SCSI problems.

Avoid mixing brands and types of SCSI cables.

If the device is the first or only one you're connecting, use a SCSI system cable to connect it to the computer's SCSI port:

SCSI system cable

If the device is not the first one, use a SCSI peripheral interface cable to connect it to the last device in the chain:

SCSI peripheral interface cable

Important The total length of the cables in a SCSI chain should not exceed 6 meters (about 20 feet). For best results, use SCSI cables manufactured by Apple Computer.

Keep the cables between SCSI devices as short as possible. Cables 18 to 24 inches long are best. PowerBook computers and some SCSI devices (particularly scanners) may not be able to work with cables longer than 24 inches.

Terminate the SCSI chain properly

To ensure accurate transmission of information, a terminator must be present at each end of a SCSI chain. There is already a built-in terminator at the beginning of the chain. Therefore, you only need to make sure that the last device in the chain has a terminator.

Important In almost all cases, only the first and last devices in the SCSI chain should be terminated (with the exceptions noted below). Make sure that no external SCSI device but the last one has a terminator.

To terminate the last device in the chain:

- Use a device that has a built-in terminator as the last device in the chain.

  If you wish to attach two or more SCSI devices that have built-in terminators, an Apple-authorized service provider can remove the extra built-in terminators.
- If the device at the end of the SCSI chain does not have a built-in terminator, attach an external terminator. You can attach or remove external terminators yourself. (Do not use a black terminator; the black terminators are for Macintosh IIfx computers and certain LaserWriter printers only.) Terminators are available at Apple-authorized dealers.

External SCSI terminator

Exceptions to the "first and last" rule: If the SCSI chain is 18 inches or shorter, the terminator on the last device is not needed. If the total cable length in the chain is greater than 10 feet, the chain may need a third terminator at the 10-foot point. Do not add the third terminator unless you are experiencing a SCSI problem, and check all other possible causes of the problem before adding the third terminator. (See the information on troubleshooting SCSI problems in Part V of this manual.)

Connecting a SCSI device

After you read "Before You Connect a SCSI Device" earlier in this chapter, follow the instructions below. Use these general instructions in conjunction with the more specific instructions that came with your SCSI device.

1 Shut down your Macintosh.

2 Make sure the SCSI device is switched off.

▲ **Warning** Do not connect or disconnect any device while the device or your Macintosh is turned on. Doing so could damage the device, your computer, or both. Do not attach or remove a terminator while the computer or any device is turned on. ▲

3 Use a SCSI cable to connect the device either to the computer's SCSI port or to the last SCSI device already in the chain.

Use the thumbscrews and metal clips on the connectors to maintain a tight, reliable connection. Do not overtighten the thumbscrews.

If you have not already done so, make sure that the SCSI chain is properly terminated, as explained earlier in this chapter.

4 Turn on all devices in your SCSI chain.

Important Always turn on all external SCSI devices connected to your Macintosh before turning on the computer itself. Otherwise, your computer won't be able to recognize that the SCSI devices are connected to it and your computer may not be able to start up.

5 If necessary, install device drivers (software that makes a device work with your computer).

Drivers needed for a SCSI device usually come on a floppy disk with the device. (If no drivers came with the device, contact the device manufacturer.)

Note: If you experience problems after connecting a SCSI device, see the troubleshooting information in Part V for possible solutions.

Connecting a printer

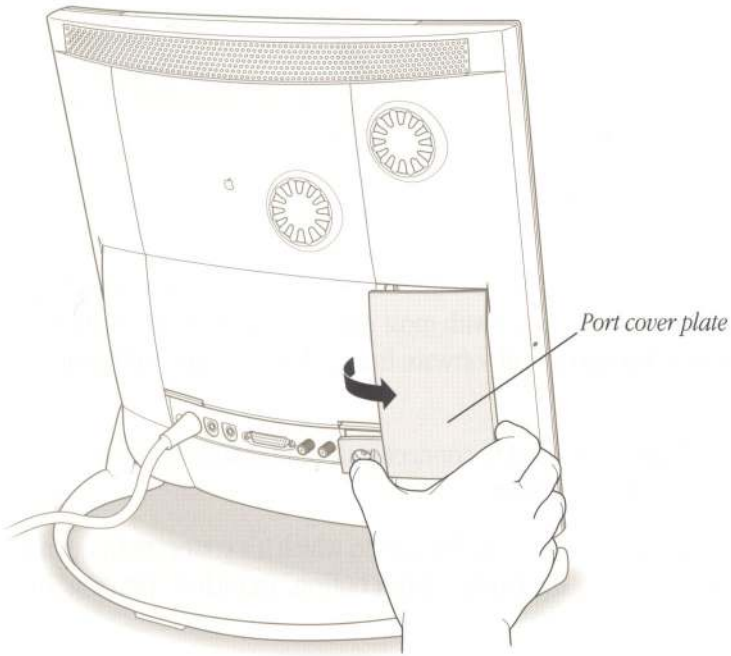
Normally, you attach the cable that came with your printer to the printer port, but you can attach it to your modem port if you already have a printer attached to your printer port.

Follow the instructions that came with your printer as well as the instructions here when connecting the printer to your computer.

The printer port is located in the area under the port cover plate.

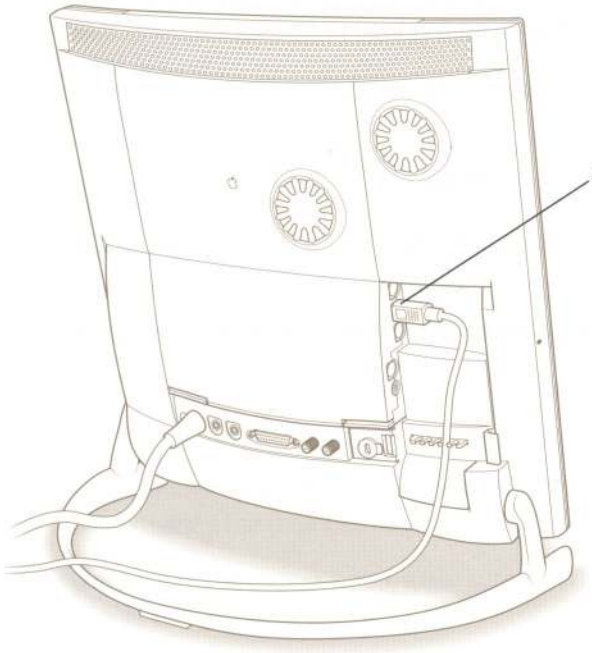
1 Remove the port cover plate from the back of the computer by squeezing it between your fingers and swinging it away from the computer.

Set the cover plate aside. (The cover plate is made up of two sections that can be easily separated and reassembled if needed.)



The port cover plate covers the ports for the modem (or GeoPort Telecom Adapter), keyboard, printer, and video equipment.

2 Plug the printer's cable into the computer's printer port.

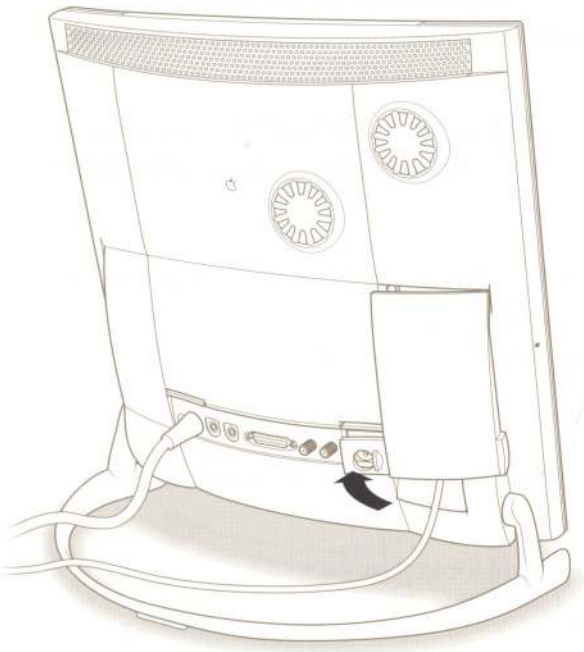


See the manual that came with your printer for more detailed information and instructions on setting up and using the printer. Although your computer comes with most Apple printer software (called *printer drivers*) already installed, you may need to install software from disks that came with your printer.

You need to specify in the Chooser which port you used to connect your printer and choose the printer you want to use (even if you have only one printer).

For instructions on choosing a printer (including specifying the port to which it's connected), open the Guide (?) menu and choose Mac OS Guide, click the Guide's Index button, and select "printing" from the list of terms.

3 Put the port cover plate back in place.



Connecting an ADB input device

Your computer has an Apple Desktop Bus (ADB) port, which connects the keyboard and trackpad to your computer. You can add other input devices, such as a mouse, numeric keypad, bar-code reader, graphics tablet, or joystick.

You can plug an additional ADB device into the extra ADB port on the keyboard. You can also connect up to three ADB devices in a chain to a single ADB port. The exact number of devices possible in a chain depends on how much power the devices require.

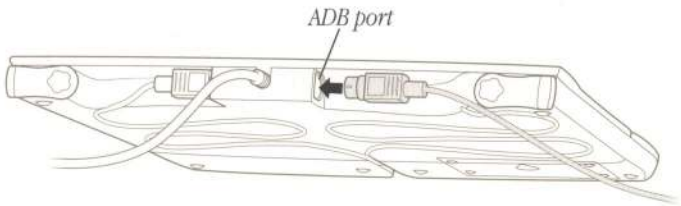
Important The total power used by all ADB devices connected to your computer must not exceed 500 milliamperes (mA). Before attaching another ADB device, check Appendix D, "Technical Information," and the information that came with the ADB device for power requirements.

1 Shut down the computer.

Attaching or removing an ADB device while the computer is turned on could damage the ADB device or your computer.

2 Plug the additional ADB device into the extra ADB port on the keyboard.

The ADB port is marked with the ⌁ icon.



3 Start up the computer.

Securing your computer

To deter theft of your computer, keyboard, and other equipment attached to ports under the port cover plate, you can purchase a locking cable and attach it to your computer. The back of the computer has a built-in security lock port.

Follow the instructions supplied with the locking cable to secure it to your computer. When you install the locking cable, make sure the port cover plate is on.

Chapter Ten

Installing Expansion Cards and Memory

This chapter provides information about expansion cards and memory, and explains how to install both.

Installing an expansion card or memory involves three procedures (detailed steps for each are provided later in this chapter):

- opening the computer
- inserting the card or memory module into a specific slot
- closing the computer

▲ **Warning** Although instructions for installing memory and expansion cards are provided in this manual, Apple Computer recommends that you have an Apple-certified technician install them. Consult the service and support information that came with your computer for instructions on how to contact an Apple-authorized service provider or Apple for service. If you install these items yourself, you risk damaging your equipment, and this damage is not covered by the limited warranty on your computer.

Besides the area under the back cover, the computer does not have user-serviceable parts. Do not attempt to service any parts inside the computer, other than the areas covered in this chapter. If you do so, you may reduce the computer's performance or damage the computer. Such damage is not covered by the limited warranty on your computer.

For information on any warranty question, consult the service and support information that came with your computer for information on contacting Apple or an Apple-authorized service provider for assistance. ▲

About expansion cards

You can install printed circuit boards (called *cards*) for video and graphics applications, networking and communications, additional processing power, or other purposes. The cards fit into connectors in expansion slots inside the computer.

Your computer has two expansion slots. One is designed for a 7 inch long PCI expansion card. The other is designed for the Apple Ethernet CS II Card or other networking or modem card.

Install only expansion cards that come with Macintosh drivers and are compliant with the PCI 2.0 standard. NuBus™ cards cannot be used in these expansion slots.

Expansion card power requirements

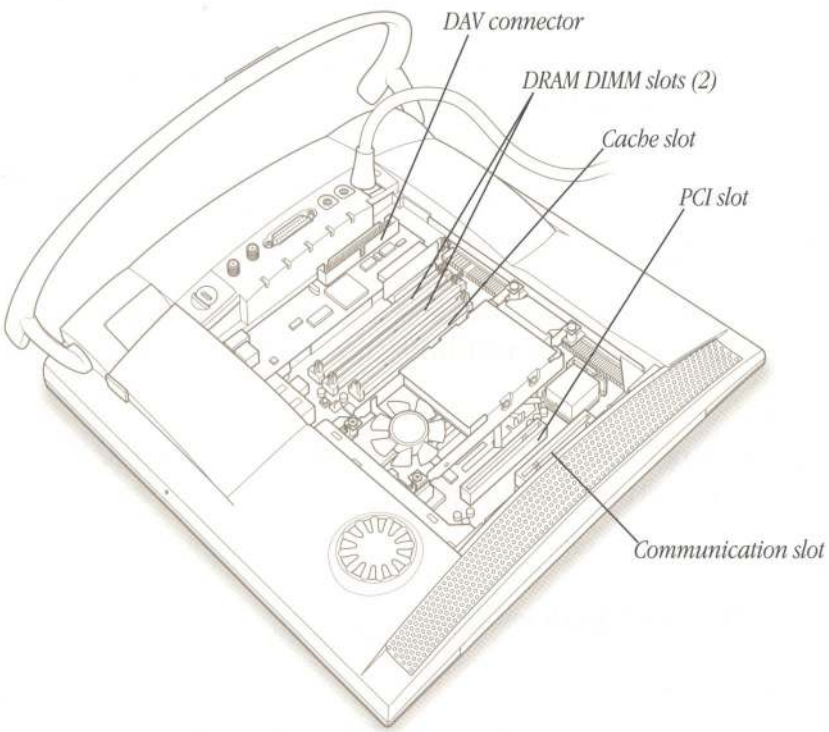
The combined power consumption of expansion cards must not exceed the limits specified for your computer model. If you have more than one expansion card installed, check the information that came with your cards to make sure that their power consumption is within the limits specified in Appendix D, "Technical Information."

▲ **Warning** To avoid damaging your computer and expansion card, do not attempt to install any expansion card without first checking the documentation for that card. If the documentation specifies that an Apple-certified technician must install the card (usually because the installation requires special training or tools), consult the service and support information that came with your computer for instructions on how to contact an Apple-authorized service provider for assistance. If you attempt to install the card yourself, any damage you may cause to the computer or card will not be covered by the limited warranty on your computer. If the card is not an Apple-labeled product, check with an Apple-authorized dealer or service provider to see if you can install it yourself. ▲

About memory

You can add memory—dynamic random-access memory (DRAM)—to your computer in packages called *Dual Inline Memory Modules,* or *DIMMs*.

The following illustration shows the locations of memory and expansion card slots in your computer.



DRAM configurations

You can increase your computer's DRAM up to 128 MB. The main logic board has two DIMM slots where you can install DIMMs that meet these specifications:

- 8, 16, 32, or 64 MB (32 MB of DRAM is already installed in either a single 32 MB DIMM or two 16 MB DIMMs)
- 64-bit wide, 168-pin
- 60-nanosecond (ns) RAM access time or faster (If you install DIMMs with different speeds, they will all operate at the speed of the slowest DIMM installed.)
- 2K refresh rate
- extended data output (EDO) or fast-paged mode (if a fast-paged mode DIMM is mixed with another type, the combined memory may not operate at fast-paged mode timing)

Important The Single Inline Memory Modules (SIMMs) from older Macintosh computers are not compatible with your computer and should not be used. DIMMs that require a 4K refresh rate should not be used.

To increase DRAM to the maximum of 128 MB, take out the two 16 MB DIMMs or single 32 MB DIMM that came with the computer, and install two 64 MB DIMMs.

VRAM configurations

Your computer comes with 2 MB of VRAM already installed.

Cache configurations

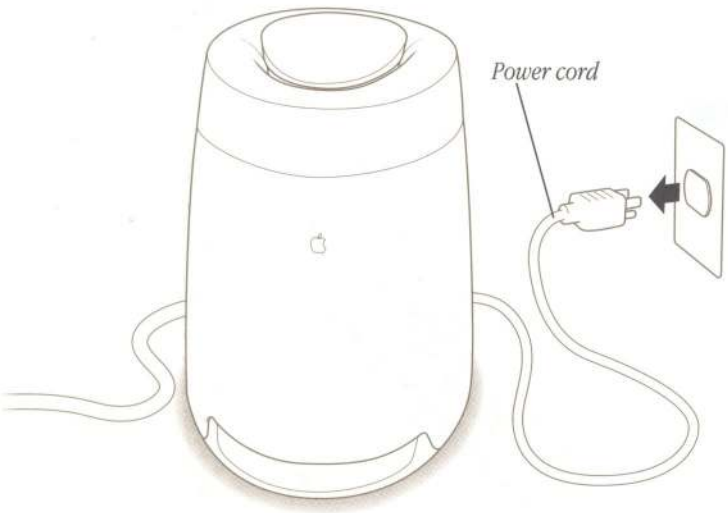
Your computer comes with a 50-megahertz (MHz) High Performance Module (256K level 2 cache) already installed.

Opening the computer

Follow these instructions to open the back of your computer before you install an expansion card or memory.

1 If your computer is turned on, turn it off by choosing Shut Down from the Special menu.

2 Unplug the power cord (attached to the bass unit) from the wall outlet.



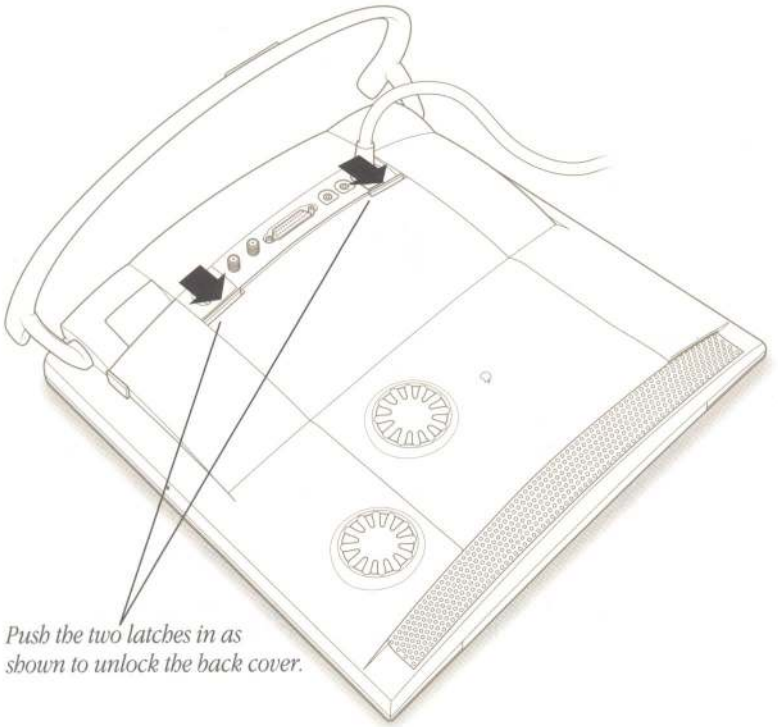
3 If the computer cover is locked shut, unlock it by removing the security cable or padlock from the cover latch.

Do not remove the computer cover yet.

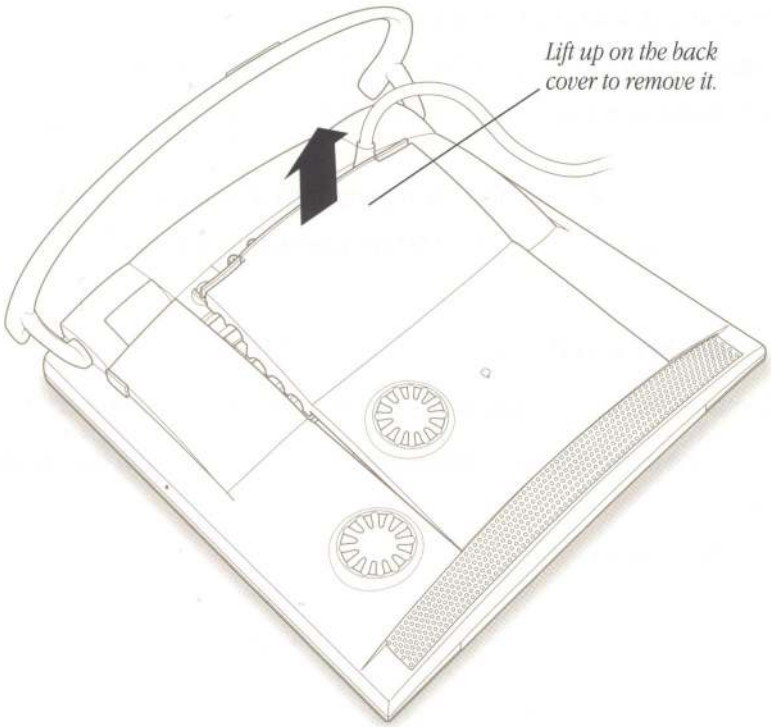
4 Carefully lay the computer on a flat, cushioned table surface with the back cover facing up.

Make sure that the table is clear of all objects. Lay some padding material down to cushion the speaker fabric on the front of the computer.

5 Remove the back cover as shown in the next two illustrations.



Push the two latches in as shown to unlock the back cover.



6 Set the cover aside.

If you are installing an expansion card, you won't be putting the original back cover on again; you'll use the expansion cover instead. Store the original back cover in a plastic bag to protect its metal shielding. (If you are going to install an expansion card, you can store the original back cover in the bag from the expansion cover.)

What you do next depends on what you're adding to your computer.

- If you are installing a PCI expansion card, go to "Installing a PCI Expansion Card," next.
- If you are installing a communication card, go to "Installing a Communication Card," later in this chapter.

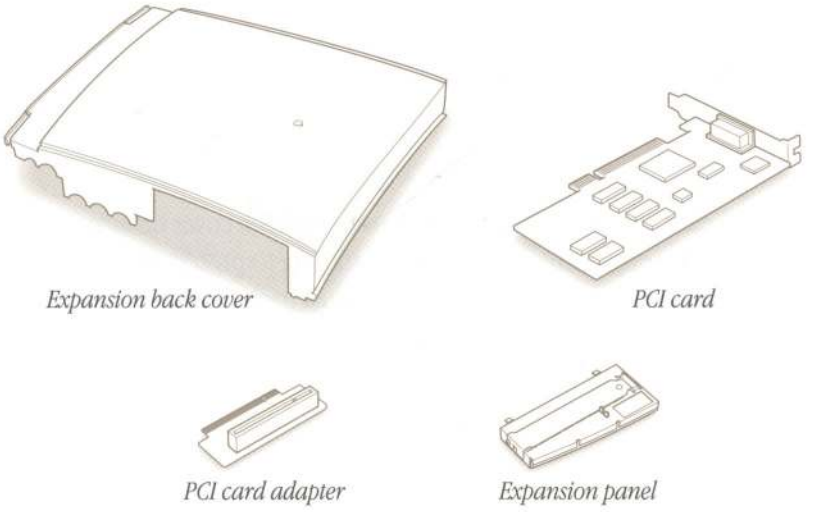
  If you are installing two cards, install the PCI card first, then install the communication card.
- If you are installing memory, go to "Installing Memory (DRAM)" later in this chapter.

Installing a PCI expansion card

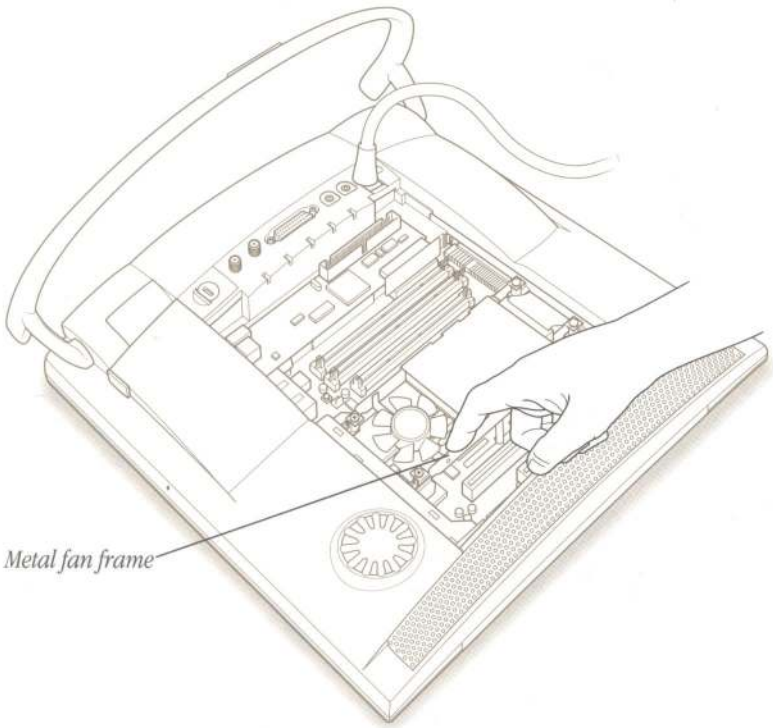
This section contains general instructions on installing a PCI expansion card in your computer.

Before you start, be sure to follow the instructions in "Opening the Computer," earlier in this chapter. Then follow these instructions:

1 Assemble the parts you'll need (shown here).



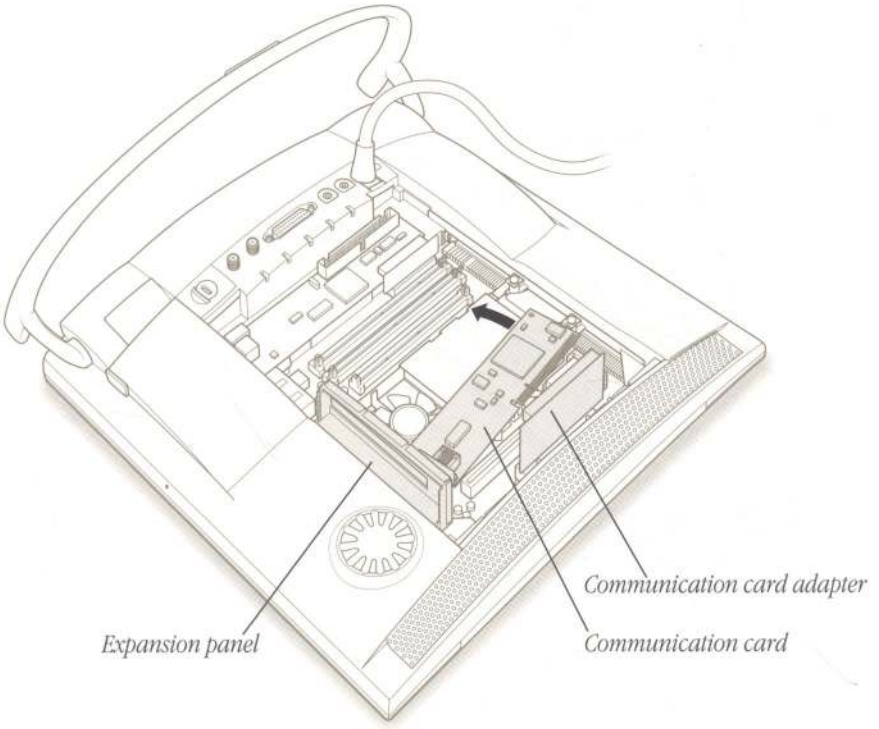
2 Touch the metal fan frame inside the computer to discharge static electricity from your body. Always do this before you touch any parts, or install any components, inside the computer.



3 If your computer has a communication card, remove it and the expansion panel as shown in the illustration.

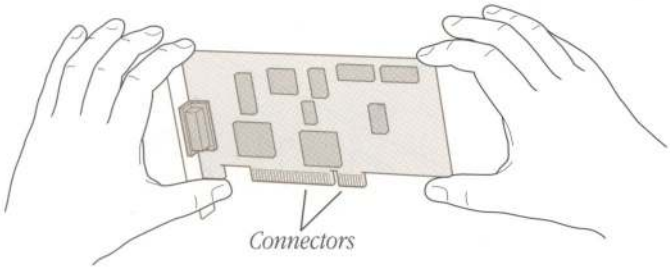
Set the card and expansion panel aside until you are ready to reinstall them. You can leave the communication card adapter in place.

If your computer does not have a communication card, skip this step.

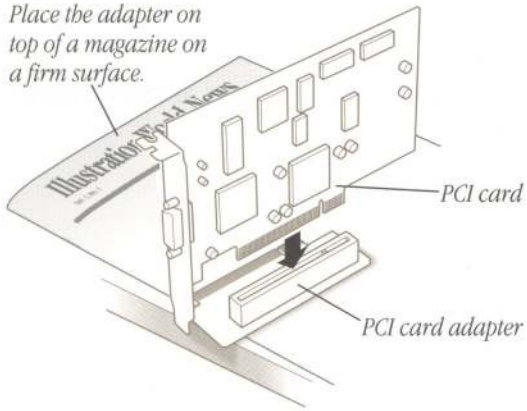


4 Remove the PCI card from its static-proof bag.

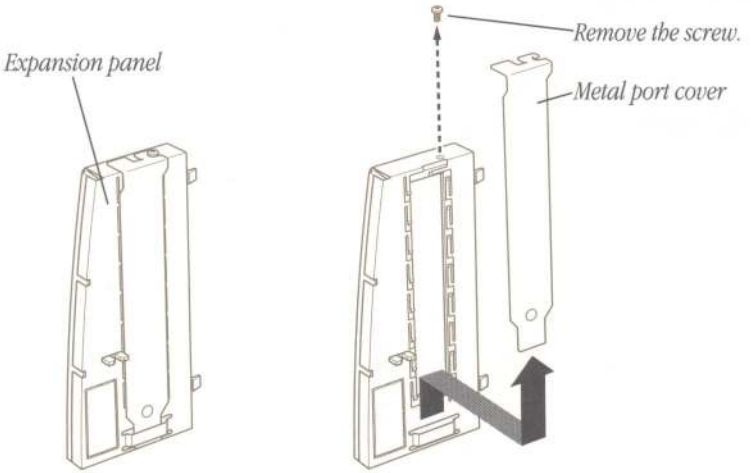
Hold the card by its edges to avoid touching any of the components on the card.



5 Attach the PCI card adapter to the PCI card.

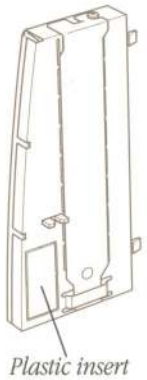


6 Remove the screw at the top of the expansion panel and then lift out the metal port cover.

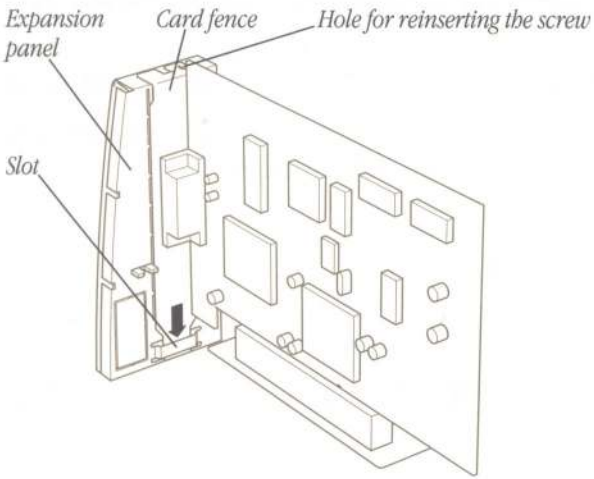


7 If you will be installing a communication card after you install the PCI card, press to remove the plastic insert covering the port opening on the expansion panel.

If you are not going to install a communication card, skip this step.

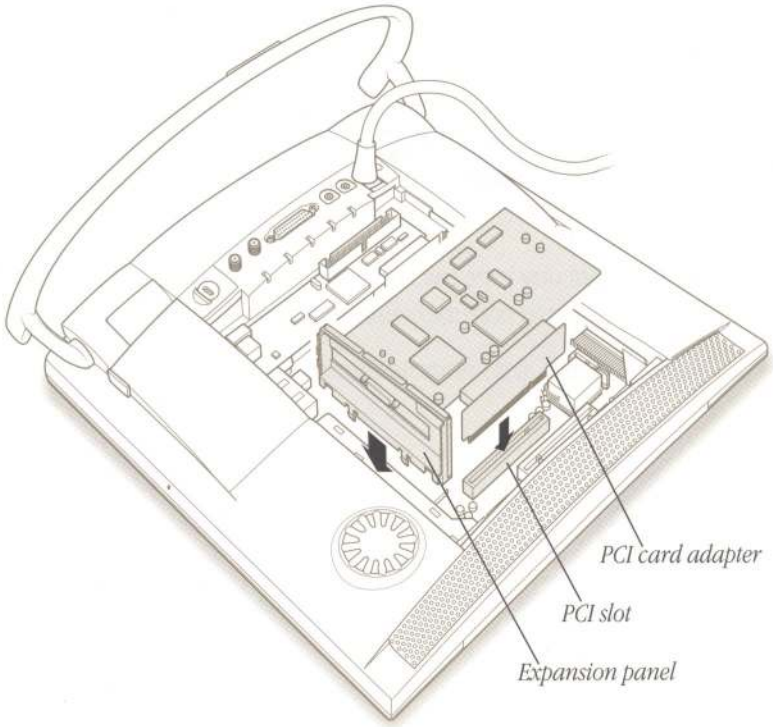


8 Attach the expansion panel to the PCI card by sliding the card fence into the same slot the metal port cover was in, then reinserting the screw you removed in step 6.



9 Insert the PCI card with its attachments into the computer's PCI slot, pressing down firmly until all parts are fully inserted.

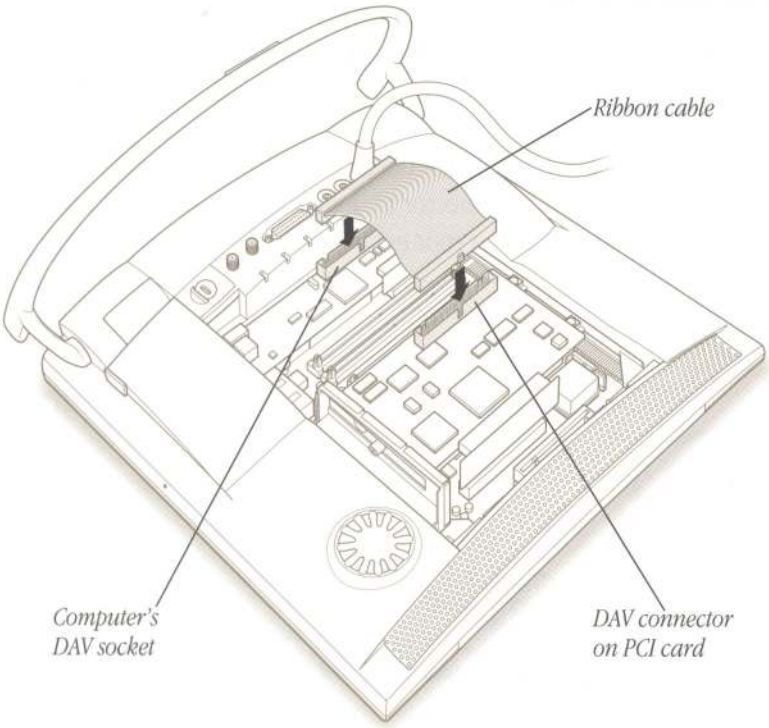
- Don't rock the card side-to-side; instead, press the card's connectors straight into the slot. (Rocking the card can damage the PCI slot.)
- Press firmly but don't force the card. If you meet a lot of resistance, pull the card out and try again.
- To see if the card is properly connected, pull it gently. If it resists and stays in place, it's connected. (Make sure you don't pull the card so much that you accidentally disconnect it.)



10 If your card includes a DAV connector and ribbon cable, plug the cable into the card and the computer's DAV socket. (If two cables are supplied, use the longer cable.)

Video editing cards and some ISDN cards have DAV connectors.

Note: If your card does not include a DAV connector and cable, skip this step.



What you do next depends on whether or not you have additional items to install:

- If you are installing a communication card, or reinstalling a card you removed at the beginning of these instructions, proceed to "Installing a Communication Card."
- If you are installing memory, proceed to "Installing Memory (DRAM)."

- If you are finished installing items in your computer, skip ahead to "Closing the Computer" later in this chapter.

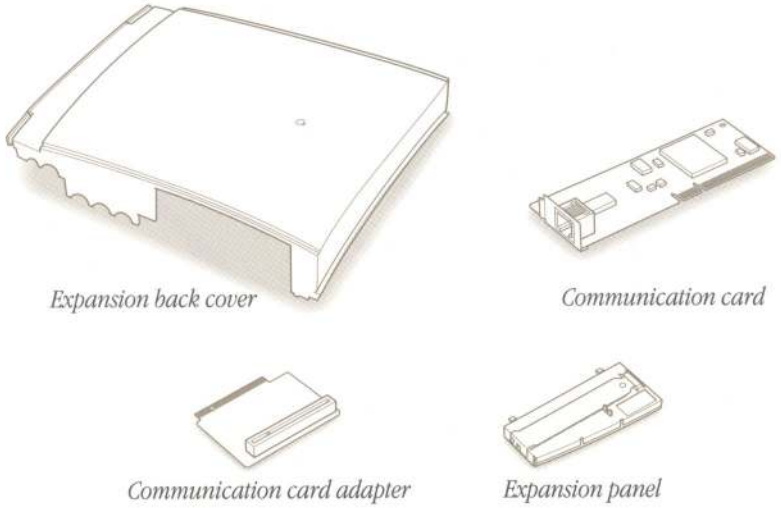
After you close the computer, see the manual that came with your PCI card for more instructions.

Installing a communication card

This section contains instructions for installing a communication card, such as an Apple Ethernet CS II card, in your computer's communication card expansion slot.

Important If you're installing the Apple Ethernet CS II Thin Coax Card, a T-connector is connected to your card. Before you install the card, twist the T-connector to unlock it from your card and set it aside. Save the T-connector; you'll need it to connect to your network.

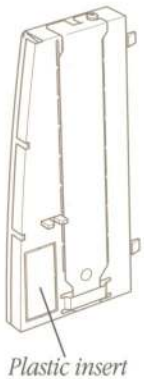
1 Assemble the parts you'll need (shown here).



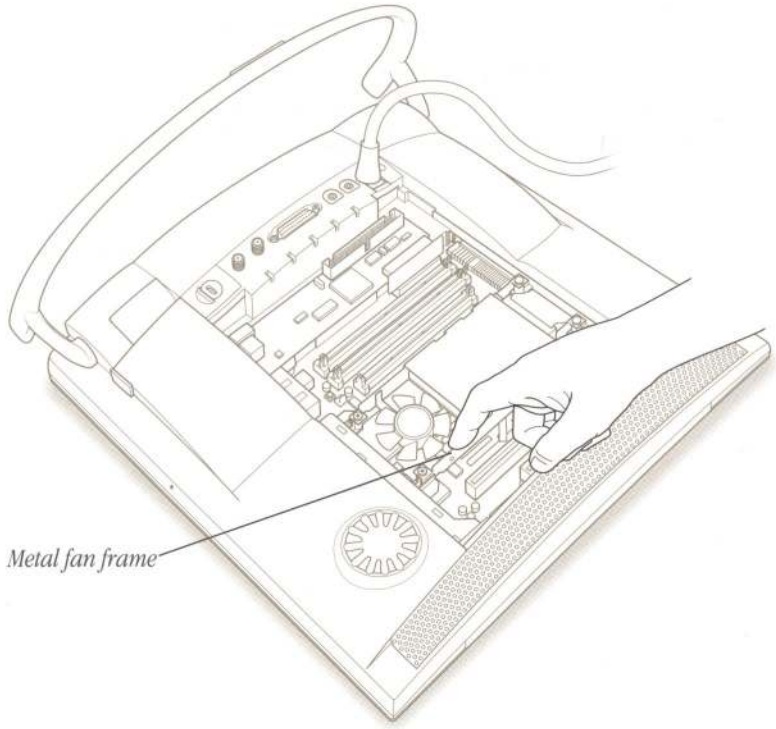
Before you start, be sure to follow the instructions in "Opening the Computer," earlier in this chapter. Then follow these instructions:

2 Press to remove the plastic insert covering the port opening on the expansion panel.

If you have a PCI card already installed in your computer, the expansion panel is attached to the PCI card inside the computer. Remove the PCI card and expansion panel, then press to remove the plastic insert shown in the illustration below. Reinstall the PCI card and continue with these instructions. (For help re-installing the PCI card, see step 9 under "Installing a PCI Expansion Card," earlier in this chapter.)

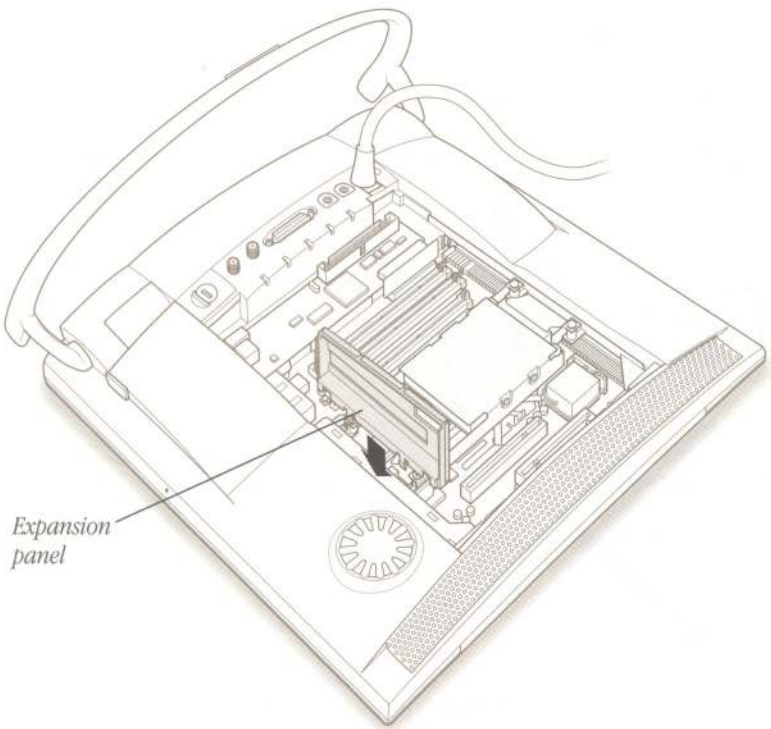


3 Touch the metal fan frame inside the computer to discharge static electricity from your body. Always do this before you touch any parts, or install any components, inside the computer.

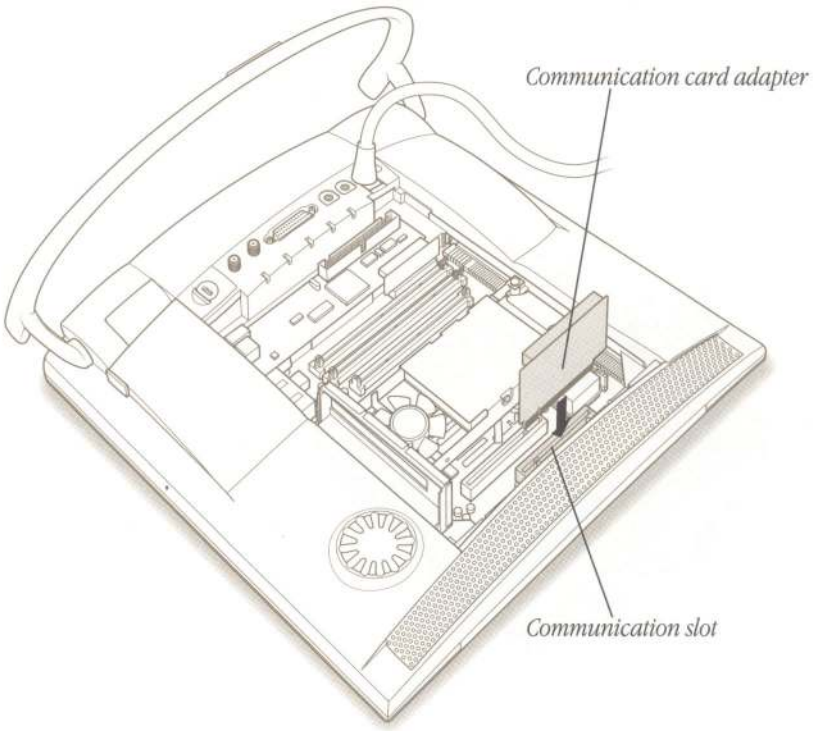


4 Attach the expansion panel to the computer.

If you have a PCI card installed in your computer, you can skip this step because the expansion panel is already attached to the computer.

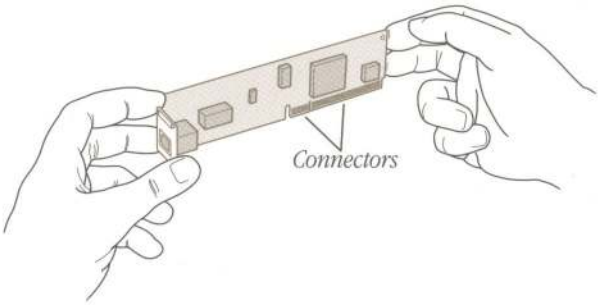


5 Plug the communication card adapter into the computer's communication card expansion slot.

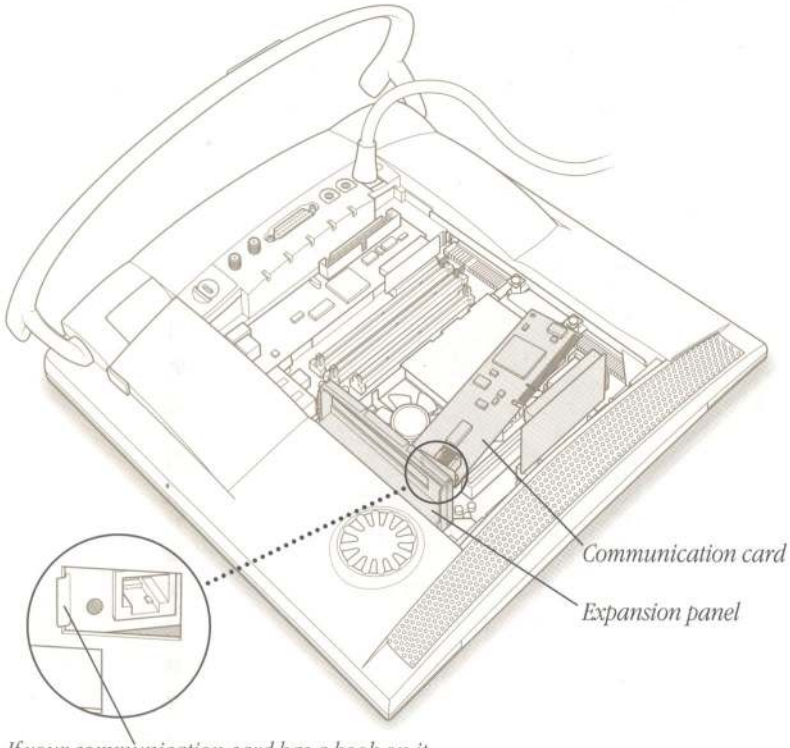


6 Remove the communication card from its static-proof bag.

Hold the card by its edges to avoid touching any of the components on the card.

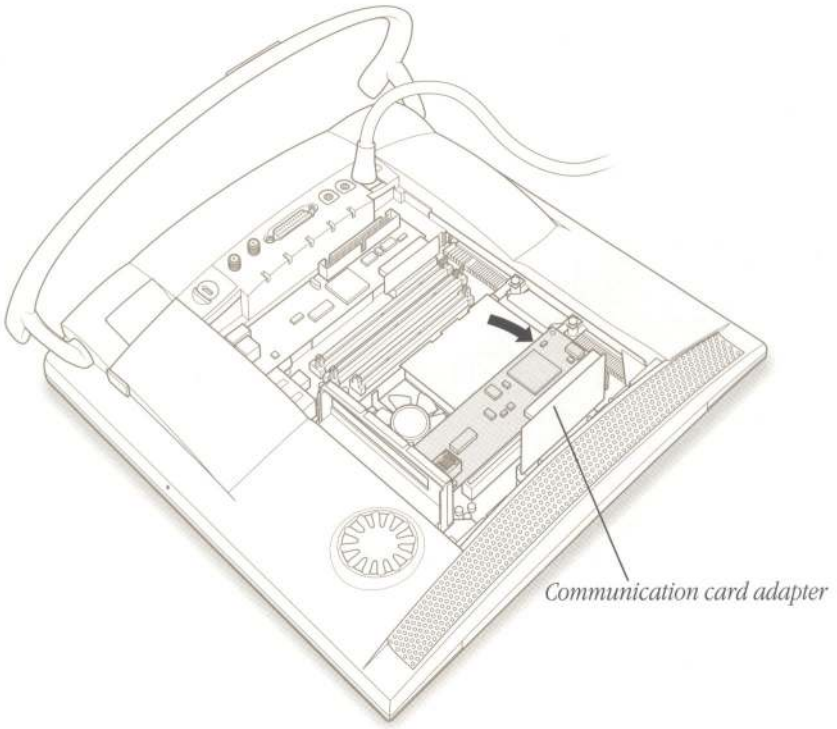


7 Align the end of the communication card with the expansion panel.



If your communication card has a hook on it, be sure that the hook engages the expansion panel.

8 Rotate the communication card into place, pressing it firmly into the communication card adapter.



If you are installing memory, proceed to the next section. If you are finished installing items in your computer, skip ahead to "Closing the Computer," later in this chapter.

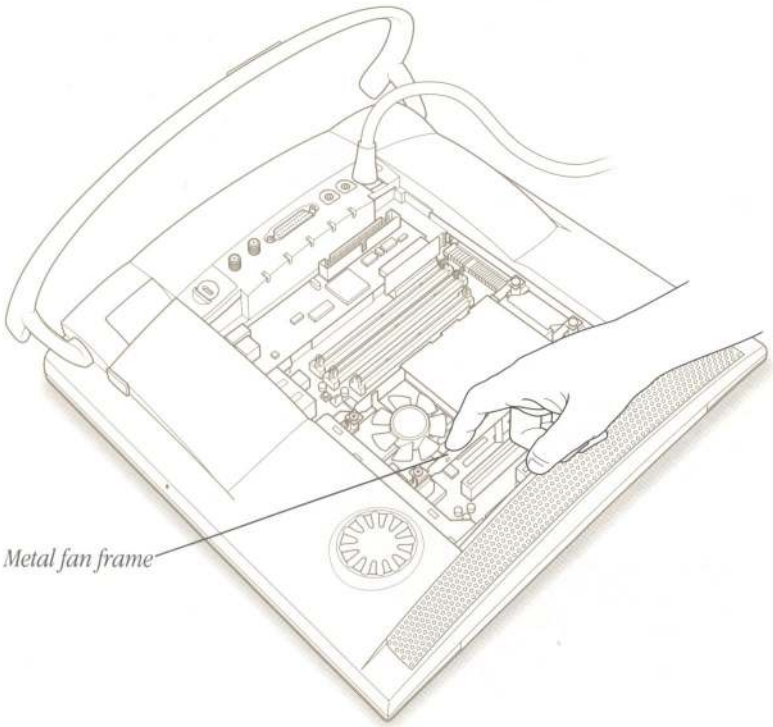
Installing memory (DRAM)

This section explains how to install additional memory (DRAM) in your computer.

Before you start, be sure to follow the instructions in "Opening the Computer," earlier in this chapter. Then follow these instructions:

1 Touch the metal fan frame inside the computer to discharge static electricity from your body.

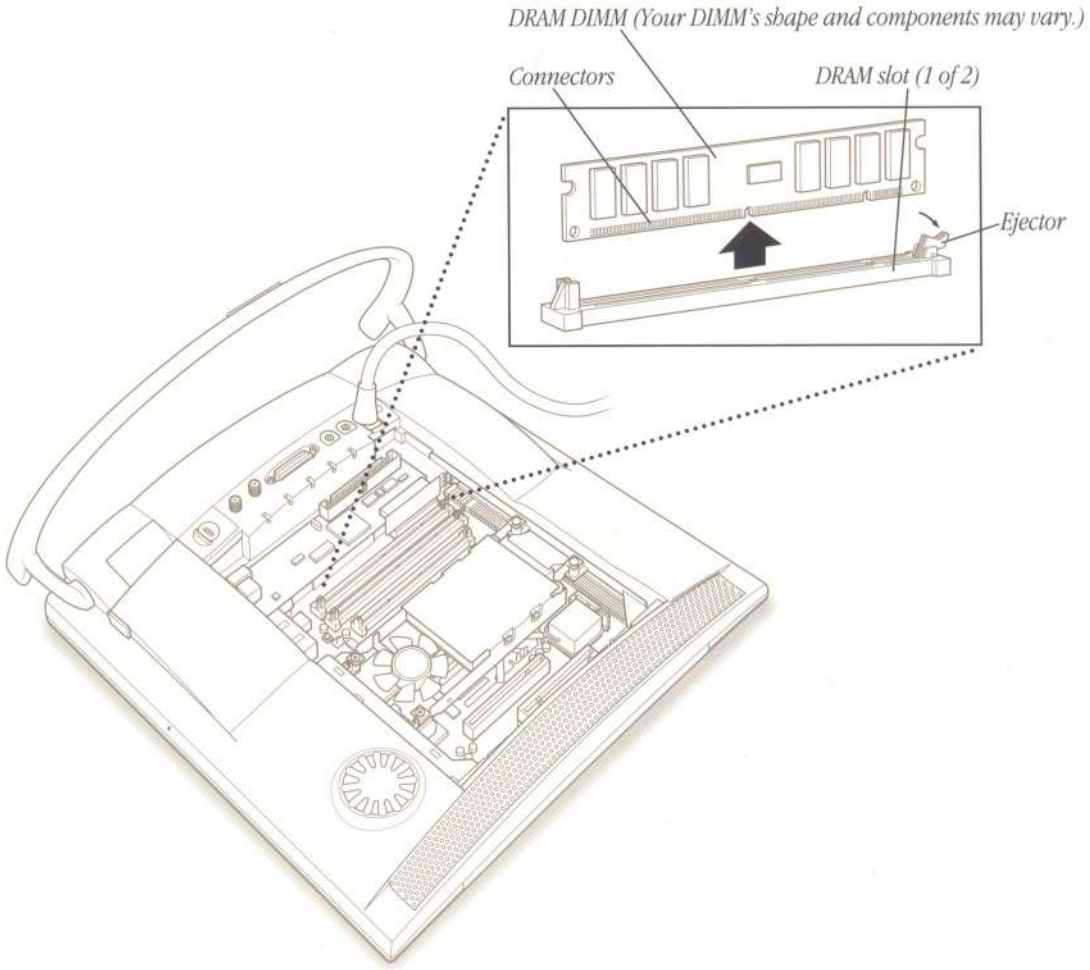
Always do this before you touch any parts, or install any components, inside the computer.



2 If you need to remove one or more existing DIMMs to make room for new ones, remove them now.

Hold the DIMM along its side edges, and press down on the ejector as shown. The DIMM will be released from its slot. Pull the DIMM straight up and out of the slot.

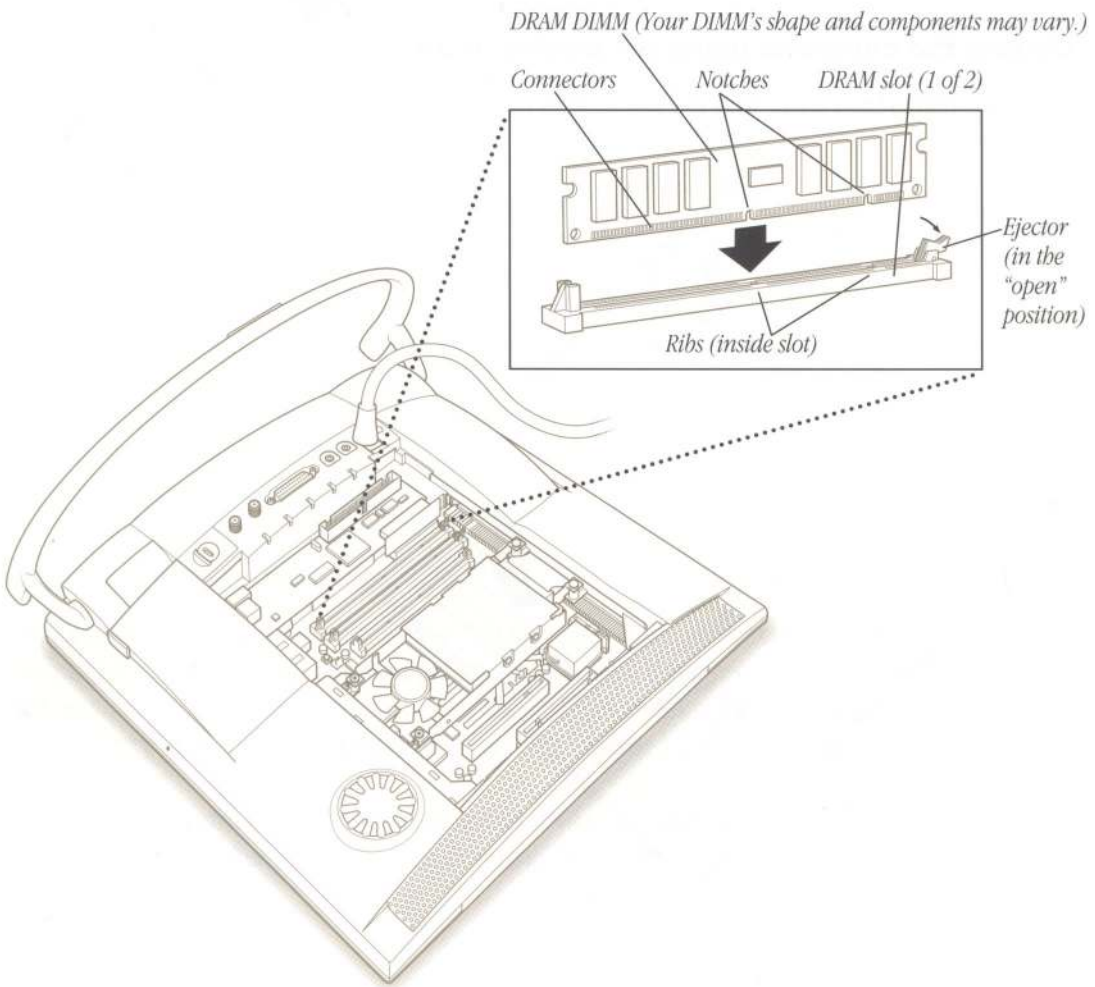
Important Do not touch the DIMM's connectors. Handle the DIMM by the edges only.



3 Place the DRAM DIMMs in the DRAM slots as pictured.

The DIMM fits into the slot only one way. Align the notches in the DIMM with the small ribs inside the slot. With the ejector in the open position (as shown), push down on the DIMM until it snaps into place. The ejector closes automatically.

Important Do not touch the DIMM's connectors. Handle the DIMM by the edges only.



Closing the computer

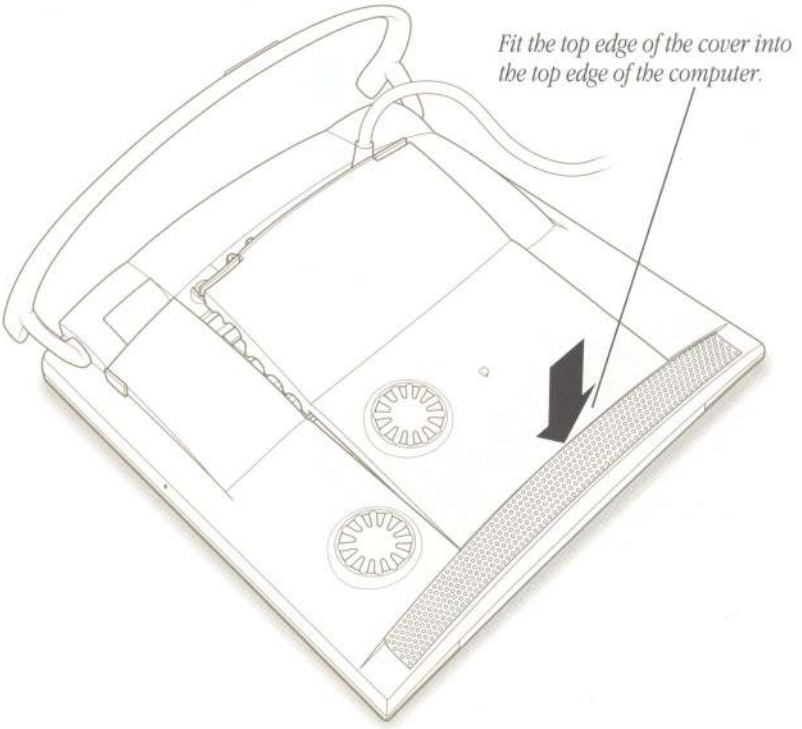
There are two back covers for your computer:

- the original back cover, which you should replace if you installed additional memory only (no expansion cards)
- the expansion cover, which you should use if you installed any expansion cards

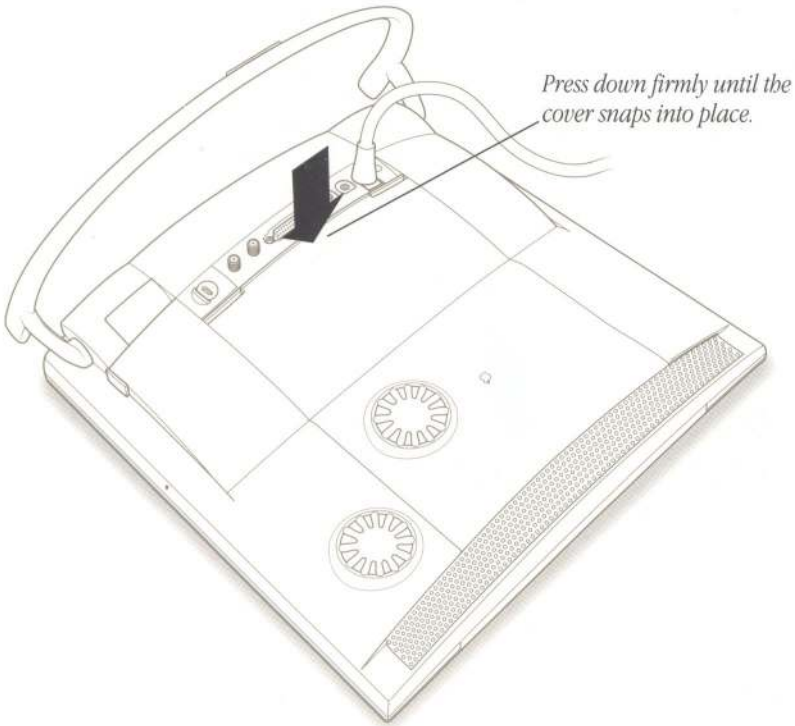
Follow the instructions for attaching the appropriate back cover.

Closing the computer using the original back cover

1 Align the original back cover with the top edge of the computer.



2 Snap the original back cover into place.



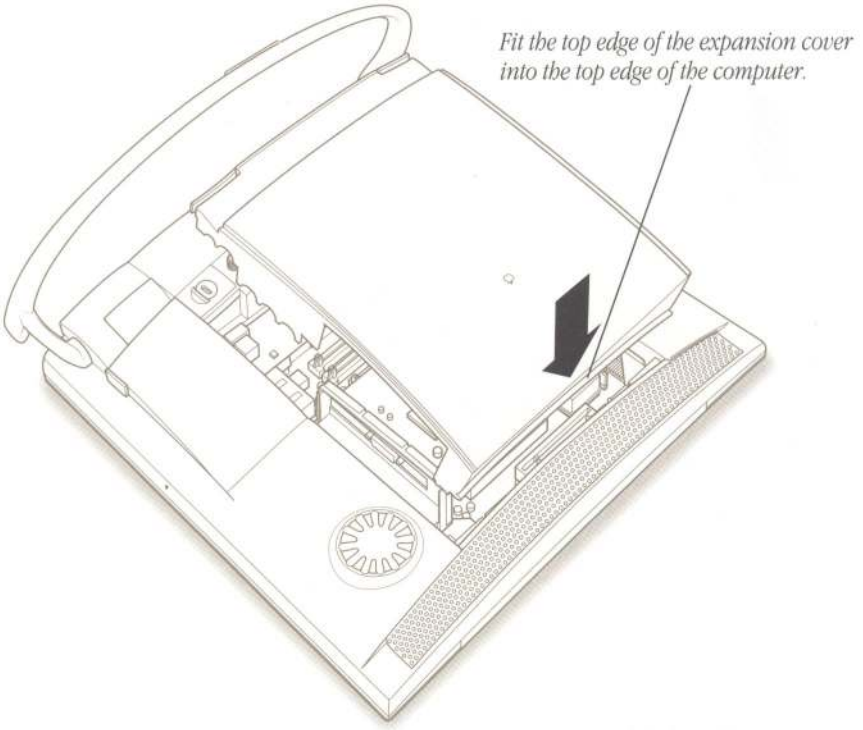
3 Lift up the computer so that it sits upright.

You are now finished with the installation. You may plug in the power cord you disconnected, turn on the computer, and start using the equipment you installed. If you see a "sad Macintosh" icon when you start up your computer after adding memory, shut down and turn off the computer and check to see if the memory you added is properly installed and firmly seated in the DIMM slots.

▲ **Warning** Never turn on your computer unless all of its internal and external parts are in place. Operating the computer when it is open or missing parts can be dangerous, and can damage your computer. ▲

Closing the computer using the expansion cover

1 Align the expansion cover with the top edge of the computer.



2 Snap the expansion cover into place.

3 Lift up the computer so that it sits upright.

You are now finished with the installation. You may plug in the power cord you disconnected, turn on the computer, and start using the equipment you installed. If you see a "sad Macintosh" icon when you start up your computer after adding memory, shut down and turn off the computer and check to see if the memory you added is properly installed and firmly seated in the DIMM slots.

▲ **Warning** Never turn on your computer unless all of its internal and external parts are in place. Operating the computer when it is open or missing parts can be dangerous, and can damage your computer. ▲

Part Five

Troubleshooting

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Chapter Thirteen

Techniques for Diagnosing and Solving Problems 244

Start Here If Trouble Occurs

Your computer came with a booklet that describes the service and support options that are available from Apple. It contains phone numbers you can call if you have trouble with your computer and also describes many other ways of obtaining support information from online services, the Internet, and automated fax services.

Before you contact Apple for help with your computer, however, follow the advice in this chapter and Chapter 12. Only call Apple if nothing in this manual helps. If you know the problem is with an application program not published by Apple, call the application's publisher.

You'll find you can solve many problems with your computer on your own by following the general troubleshooting methods in this chapter, or the specific troubleshooting methods in Chapter 12, "Solutions to Common Problems," and Chapter 13, "Techniques for Diagnosing and Solving Problems."

Step 1: Gather as much information as you can

When you see an error message, you don't have to take action immediately. The message stays on the screen until you click the OK (or Restart) button or turn off the computer.

- Make a note of exactly what you were doing when the problem occurred. Write down the message on the screen and its ID number (if any).
- List the programs you were using and the names of any items you know have been added to the System Folder since the system software was installed. This information will help a service person diagnose the problem, if you need to call later.

- Check the screen for any clues. Is a menu selected? What programs and document icons are open? Note anything else that seems relevant.
- If you were typing text and were not able to save it before the problem occurred, write down the parts of the text still visible on the screen so that some of your work will be easy to replace.
- Ask other Macintosh users about the problem you're having; they may have a solution for it.

Step 2: Restart your computer

Often you can eliminate a problem simply by restarting your computer, thereby clearing the computer's memory.

To restart your Macintosh when you are having trouble, try the following steps:

1 If you can, save any open documents before restarting.

If your system is frozen and does not respond to anything you do, or if you have a "bomb" message on the screen, saving may not be possible. You can try pressing ⌘-Option-Esc to quit the program in use when the problem occurred; if this works, you can then save the documents open in other programs before restarting.

Note: Restart the computer immediately after you save your documents. Quitting a program using ⌘-Option-Esc may leave corrupted data in the computer's memory, and this corrupted data is erased when you restart. Use this key combination to force a program to quit only when you can't choose Quit from the File menu.

2 If you can, choose Restart from the Special menu or from the dialog box that's on screen.

Dialog boxes contain messages from the computer. If something goes wrong, a message may appear on the screen asking you to restart.

3 If you can't choose Restart, press the Power key (marked with a ◁) on the keyboard.

Click Restart in the dialog box that appears.

4 If the Power key (◁) doesn't work, try it again while you hold down the ⌘ and Control keys.

This key combination restarts the computer. (Only use this key combination when you can't choose Restart from the Special menu or restart the computer using the Power key.)

5 If your computer still doesn't restart, press the power button on the back of the computer to turn it off, wait at least 10 seconds, and turn it on again by pressing the Power key (◁) on the keyboard.

If you suspect that the problem is with other equipment, such as a printer or an external hard disk that's attached to your computer, shut down the computer, turn off the other equipment for 10 seconds or longer, then turn it on again and restart your computer.

Step 3: Check onscreen help, if you can

Mac OS Guide contains some troubleshooting information that is not included in this user's manual. If you are able to start up your computer properly, choose Mac OS Guide from the Guide (?) menu; click the Guide's Topics button, and choose Troubleshooting from the list.

Step 4: Go to the next chapter, "Solutions to Common Problems"

If none of the tips here help, you can probably find a solution for your particular problem in the next chapter, "Solutions to Common Problems."

If you suspect the problem may be with a program not published by Apple, contact the program's publisher.

Step 5: Use Apple System Profiler

Apple System Profiler is a small program, called a *utility,* that lets you quickly view different types of information about your computer to help you and the Apple Assistance Center solve problems with your computer.

Opening Apple System Profiler

If you are able to start up your computer properly, choose Apple System Profiler from the Apple (🍎) menu to open the utility.

When you open Apple System Profiler, a System Overview window appears.

Getting information about different hardware and software

To display information about hardware and software used by your computer, open the Select menu and choose one of the following commands:

- *System Overview:* for general information about your computer, including what type of processor it's using, how much memory is installed, and what version of Mac OS is installed.
- *Volume Information:* for information about disks and disk partitions that your computer can access.
- *Device Information:* for information about equipment, such as CD-ROM drives and scanners, connected to your computer.
- *Control Panel Information:* for a list of control panels installed on your computer. You can view all control panels, only non-Apple control panels, or only Apple control panels. You can also tell whether a control panel is currently turned on ("enabled").
- *Extension Information:* for a list of system software extensions installed on your computer. You can view all extensions, only non-Apple extensions, or only Apple extensions. You can also tell whether an extension is currently turned on.
- *System Folder Information:* for a list of System Folders on your startup disk. Having more than one System Folder can cause problems. If you see more than one System Folder in the list, the extra one might be responsible for the problem you're having.

Getting help

To find out what the different items in the Apple System Profiler window mean, click the Balloon Help (?) button in the upper-right corner of the window. Then use the trackpad to place the pointer on the item you want to know about.

Solutions to Common Problems

This chapter contains descriptions of specific problems you might experience with your computer and suggestions for solving the problems. If you haven't already tried the general troubleshooting tips in Chapter 11, do that first. Then return to this chapter.

Only call Apple if nothing in this manual helps. If you know the problem is with a program not published by Apple, call the program's publisher.

If you need repair service, consult the service and support information that came with your computer for instructions on how to contact an Apple-authorized service provider or Apple for assistance.

▲ **Warning** If you have a problem with your computer and nothing presented in this manual solves it, consult the service and support information that came with your computer for instructions on how to contact an Apple-authorized service provider or Apple for assistance. If you attempt to repair the computer yourself, any damage you may cause will not be covered by the limited warranty. Consult the service and support information that came with your computer for information on contacting an Apple-authorized dealer or service provider for additional information about this or any other warranty question. ▲

Problems turning on or starting up your computer

The computer is turned on but the screen is dark.

One of the following is probably the cause:

- You have a screen saver program that darkens the screen when the computer has not been used for a certain period of time.

  Press a key or move the pointer to turn off the screen saver. (Screen saver programs interfere with the computer's power conservation feature, so you may want to remove the screen saver or keep it turned off.)

- Your computer has gone to sleep due to inactivity. "Wake it up" by pressing the Power key (marked with a ◁) on the keyboard.

- The screen's brightness control (☼) is not adjusted properly.

  Check the screen's brightness control and turn it up if necessary.

- There is something wrong with the power supply to the computer. Turn the bass unit over and check the recessed well on the underside. You should see a green status light. If the green status light is not on, try plugging the computer into a different outlet.

  Make sure that the flow of air around the bass unit is not blocked.

The computer makes an unusual sound at startup.

- If you hear four tones, try starting up the computer from the system software CD-ROM disc. For instructions, see "Starting Up From the System Software CD-ROM Disc" in Chapter 13. If the hard disk icon appears, you can probably repair the hard disk using the instructions in "Testing Your Hard Disk" in Chapter 13. If the computer does not start up, or if the hard disk icon does not appear, the hard disk may need professional repair. Contact an Apple-authorized service provider or call for assistance (see the service and support information that came with your computer).

- There may be a problem with the information stored in the area called parameter RAM (PRAM) or nonvolatile video RAM (NVRAM). Reset the NVRAM and the PRAM (also called "zapping the PRAM").

  When you reset the PRAM and NVRAM, the settings on most of your computer's control panels revert to their defaults (original, standard settings). You may want to check the settings in your control panels for memory, networking, and monitors, and any aspect of your work that seems affected after you reset PRAM and NVRAM.

  Follow these steps to reset the PRAM and NVRAM:

  1. Shut down your computer by pressing the Power key (◁) and then clicking Shut Down.
  2. Make sure the Caps Lock key is not engaged.
  3. Position the fingers of your left hand on these keys: Command (⌘), Option, and R. Locate the P key, so you can find it quickly for step 4.
  4. Press the Power key (◁) to turn on your computer. Immediately after you hear the startup sound, press and hold down the Command (⌘), Option, R, and P keys simultaneously.
  5. When you hear the startup sound twice, release the keys. Then immediately press and hold down the Shift key to start up with extensions turned off. Release the Shift key when you see the message "Extensions off" in the "Welcome to Macintosh" box.

     If you don't see the "Extensions off" message, wait until startup is complete, then press and hold down the Shift key while you choose Restart from the Special menu. Continue to hold down the Shift key until the message appears.
  6. If the computer shuts itself off, press the Power (◁) key to turn it back on.
  7. Open the System Folder, then open the Preferences folder.
  8. Drag the Display Preferences icon to the Trash.
  9. Restart the computer without holding down the Shift key.

     The computer starts up with extensions turned on again.
  10. If you had specified special settings in any control panels, open those control panels to respecify the settings you want.

When you start up the computer, you see a message about the system software.

- The system software on the startup disk you're using may be incomplete or damaged or may be the wrong version. Make sure you're using the correct disk as a startup disk.
- If you're sure you're using the correct startup disk, you may need to reinstall system software. See "Installing System Software" in Chapter 13.

When you start up, a disk icon with a blinking question mark appears in the middle of the screen and stays there for longer than 15 seconds.

This icon indicates that your Macintosh cannot find the system software it needs to start up. One of the following is probably the cause:

- Your computer may be having a problem recognizing external SCSI (Small Computer System Interface) equipment, such as hard disks and scanners that you may have connected.

  Shut down your computer, turn off all external SCSI equipment, and disconnect the first SCSI device in the chain from your computer's SCSI port (marked with the ⟐ icon). Then restart the computer. If the computer starts up after you disconnect your SCSI equipment, refer both to the manuals that came with the equipment and Chapter 9, "Connecting Additional Equipment," which has information on the proper way to connect SCSI equipment and assign SCSI ID numbers.

  If you have a printer connected to your computer's SCSI port, make sure your printer is connected properly. Most printers connect to the printer port, not the SCSI port. Check the manuals that came with your printer for information on how to connect it properly.

- System software is not installed on the startup hard disk, the system software is damaged, or the hard disk is not working properly.

  Follow the instructions in "Testing Your Hard Disk," in Chapter 13, to test your startup hard disk and repair any damage. If repairing the disk doesn't help, reinstall system software on your startup hard disk. For detailed instructions, see "Installing System Software," also in Chapter 13.

A disk icon with an X appears in the middle of the screen and a floppy disk is ejected from the disk drive.

This icon indicates that the floppy disk you tried to start up from is not a startup disk. (When you turn on your computer, it looks first in the floppy disk drive for a disk containing system software. If the disk in the drive does not contain system software, the computer ejects the disk and looks on its internal hard disk for system software.)

Wait a few seconds. The computer should start up from its internal hard disk. Make sure you insert floppy disks only after the computer has begun starting up.

A "sad Macintosh" icon appears and the computer won't start up.

This icon indicates that your Macintosh cannot start up because of a problem with the system software or the computer hardware.

Eject any floppy disks by turning off the computer and then holding down the trackpad button while you turn the computer on again. Try starting up with the system software CD-ROM disc. Do this by inserting the CD-ROM disc into the CD-ROM drive and holding down the C key while you restart the computer. (For detailed steps, see "Starting Up From the System Software CD-ROM Disc" in Chapter 13.) If the "sad Macintosh" icon appears again, consult the service and support information that came with your computer for information on contacting Apple or an Apple-authorized service provider for assistance.

The computer freezes (nothing moves on the screen) after the "happy Macintosh" icon appears but before the message "Welcome to Macintosh" appears.

To determine the problem, shut down the computer and disconnect all attached equipment. Then try starting up the computer again.

- If the problem occurs with no equipment attached to the computer, the hard disk may be damaged. Follow the instructions in "Testing Your Hard Disk" in Chapter 13.
- If the computer restarts normally without any equipment attached, shut the computer down again and reattach the first piece of equipment; then restart the computer again. Do the same thing with each additional piece of equipment until you find the piece that is causing the problem. Have that piece repaired.

The computer freezes in the middle of displaying icons for system extensions at the bottom of your screen.

Check first for problems with your extensions. Shut down the computer and try starting up the computer while holding down the Shift key until you see the message "Extensions off" in the "Welcome to Macintosh" box.

- If the computer starts up when your extensions are off, two or more of your extensions may be in conflict with each other. Turn to "Checking Your System Extensions" in Chapter 13.
- If the computer still freezes during startup, your System Folder may be damaged. Follow the instructions in "Performing a Clean Installation of System Software" in the "Installing System Software" section in Chapter 13.

If you can't start up even if you hold down the Shift key to turn off all extensions, check for problems with your equipment. Shut down the computer and disconnect all attached equipment. Then try starting up the computer again.

- If the problem occurs with no equipment attached to the computer, the hard disk may be damaged. Follow the instructions in "Testing Your Hard Disk" in Chapter 13.
- If the computer restarts normally without any equipment attached, shut the computer down again and reattach the first piece of equipment; then restart the computer again. Do the same thing with each additional piece of equipment until you find the piece that is causing the problem. Have that piece repaired.

The hard disk icon does not appear on the desktop.

If you don't see a hard disk icon on the desktop, try the following:

- Use the Drive Setup program to make the disk available. Drive Setup is on the system software CD-ROM disc. For instructions on using Drive Setup, follow the instructions in "Testing for Damage on Your Hard Disk" in Chapter 13.
- If the hard disk is internal, shut down your computer and wait at least 10 seconds, and then turn it on again.
- If the hard disk is external, shut down your computer and wait at least 10 seconds. Make sure that the hard disk is turned on and that its cable is connected firmly; then restart the computer.
- Check the ID numbers of all SCSI equipment connected to your computer (anything connected to the SCSI port [⟐]). Each SCSI device must have its own unique ID number. For information on setting SCSI ID numbers, see the manuals that came with your SCSI equipment, as well as "Connecting External SCSI Devices" in Chapter 9.
- If the hard disk is your startup disk, follow the instructions in "Testing Your Hard Disk," in Chapter 13, to test your startup hard disk and repair any damage. If repairing the disk doesn't help, reinstall system software on your startup hard disk. For detailed instructions, see "Installing System Software" in Chapter 13.

Your computer starts up and you see large folder-shaped areas containing labeled pictorial buttons, instead of the usual Macintosh desktop.

- Your computer may have started up from a CD-ROM disc containing At Ease, an alternative to the Macintosh desktop. You need to have the Macintosh desktop on your screen before you can use any of the instructions in this manual.

  To return to the Macintosh desktop, choose Shut Down from the Special menu. After your computer has shut down, restart it and then immediately press the Stop/Eject button of your CD-ROM drive to open the drive door. Remove the CD-ROM disc and gently close the door. Your computer finishes starting up.

  Note: To avoid having the computer start up from a CD-ROM disc, remember to remove any disc in the drive before you shut down your computer.

Your computer won't restart, and there may or may not be a CD-ROM disc in the CD-ROM drive.

- Your computer may be trying to start up from a CD-ROM disc. Press the Stop/Eject button of your CD-ROM drive to open the door, and remove the CD-ROM disc. Close the door, then restart your computer.
- If the computer freezes, you can try to "force" the application you're using to quit by simultaneously pressing the keys Command (⌘), Option, and Esc on your keyboard. Then click Force Quit in the dialog box that appears. (*Note:* Unsaved changes in your current documents will be lost.) Immediately save all open documents, quit all other open applications, and restart the computer.
- If the problem recurs, reset the parameter RAM. (See "The Computer Makes an Unusual Sound at Startup," earlier in this section.)

Every time the computer starts up, it rebuilds the desktop.

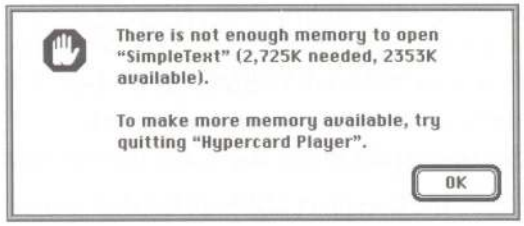
- There may be a folder on your hard disk that has the same name as a file the computer uses to keep track of information on your disks. Manually search for a folder named "Desktop" or "Desktop file." If you find one, rename it. Then restart the computer. (Do not use the Find File feature to search for the desktop file. It may find it but you may not be able to access it.)

When the computer starts up, no icons appear in the windows, and the pointer alternates between an arrow and a wristwatch, or an empty flashing box appears.

- There is a problem with the display of windows. Restart the computer, holding down the Option key until the desktop icons appear. (When the desktop appears, all windows will be closed.)

Problems with application programs, documents, and memory

You can't start an application program; you see a message that not enough memory is available.



All the memory in your Macintosh is in use by other application programs, system software, and system resources.

- Quit other open applications to free up memory, then open the application you want to use.
- Follow these steps to allocate more memory to the application:

  1 Choose About This Macintosh from the Apple (🍎) menu. Take note of the number in the Largest Unused Block section. This number tells you how much memory is available to open applications.

  2 Quit the application if it's open, select its icon, and choose Get Info from the File menu. Take note of the numbers in the Minimum Size and Preferred Size boxes.

  3 If the number in the Minimum Size box is larger than the largest unused block, not enough memory is available to use this application. To free memory, quit open applications or restart the computer. You can also type a smaller number in the Minimum Size box if you want to open the application using less memory. But some applications don't work well if you assign them less memory.

  4 If the number in the Preferred Size box is smaller than the largest unused block, you may need to assign more memory to the application. (An application may need more memory if you are working with complex documents.) Type a larger number in the Preferred Size box.

- Use the Memory control panel to reduce the size of the disk cache, remove or reduce the size of your RAM disk, or turn on virtual memory. For more information, see Mac OS Guide, available in the Guide (?) menu.

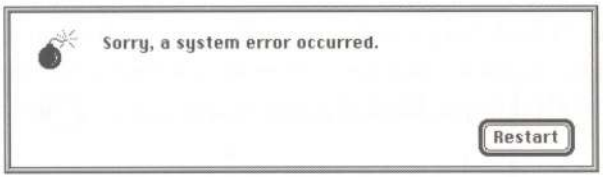
  Note: If you have both virtual memory and a RAM disk turned on in the Memory control panel, don't set both of them at or near their maximum values. Doing so can result in unpredictable or reduced performance by your computer. (RAM disk uses random-access memory, or RAM, as if it were a hard disk.)

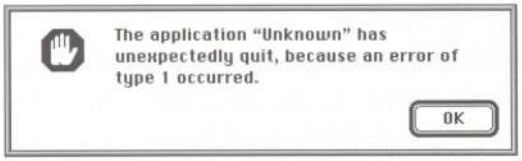
- Turn off system extensions that you don't need. For more information, see the topic on system extensions in Mac OS Guide, available in the Guide (?) menu.
- If you have installed system software additions from the Apple Extras folder such as QuickTime Conferencing or PlainTalk, you may want to remove them if you are not using them. (This software can decrease the amount of RAM available for use by application programs.) To remove a system software addition, locate and run the Installer for the software, and use its Custom Remove option to remove it.
- If you frequently want to open more applications than memory allows, you may want to install more random-access memory (RAM). See Chapter 10, "Installing Expansion Cards and Memory."

The computer "freezes." (Nothing moves on the screen.)

- Your computer may be trying to complete a task, but it's taking so long that it seems that the screen is frozen. If you need to do something else instead, try simultaneously pressing the Command (⌘) key and the period key (.) to cancel the task the computer is working on.
- There may be a temporary software problem that can be fixed by restarting your computer. Follow the instructions in "Step 2: Restart Your Computer" in Chapter 11, "Start Here If Trouble Occurs."

The computer freezes repeatedly, a dialog box with a bomb appears, or a dialog box indicates that a software application program has quit unexpectedly.





The application program needs more memory, or there is a software problem.

- Write down what you were doing when the message appeared, and write down the text of the message. This information may help a technical support representative diagnose your problem if you later need to contact Apple or the manufacturer of the application program.

About the codes in error messages: The number codes in error messages are used in software development. Sometimes they can help a technician narrow down the source of a problem. However, the codes are usually too general or technical in nature to help you diagnose a problem yourself.

- Restart your Macintosh. (For detailed steps, see Chapter 11, "Start Here If Trouble Occurs.") Most software problems are temporary, and restarting usually corrects the problem.
- Check for multiple System Folders on your startup disk, using the Find File command in the Apple (🍎) menu. Throw away extra System Folders (ones without an icon on them). The System Folder that your computer is using has a small computer icon on it.

System Folder

- Use the application's Info window to give it more memory. (Select the application's icon and choose Get Info from the File menu.) For more information on increasing an application's memory, see the topic on memory in Mac OS Guide, available in the Guide (?) menu.
- If the problem occurs when you are trying to print, there may not be enough memory for printing. Quit other open applications to free up memory.
- If the bomb only occurs in one application, try reinstalling the application from the original disks. If reinstalling doesn't solve the problem, contact the manufacturer of the application to see if the application contains software errors or "bugs" and if it is compatible with the version of system software you're using.
- Sometimes incompatible system extensions or control panels can cause system software problems. Restart while holding down the Shift key; this temporarily turns off all system extensions.

  If your computer works normally after you do this, use the Extensions Manager control panel (in the Control Panels folder available through the Apple [ ] menu) to turn on extensions and control panels one at a time. Restart after you turn on each extension. This procedure should identify incompatible extensions and control panels. (If you just added new software to your computer, its system extension is the most probable cause of the problem.) For detailed instructions, see the information about managing system extensions in Mac OS Guide, available in the Guide (?) menu.

  If your computer performs better when a particular extension or control panel is turned off, contact the software's manufacturer for information or an upgrade.

The computer exhibits odd behavior, such as many unexplained messages.

- Check for multiple System Folders on your startup disk, using the Find File command in the Apple (🍎) menu. Throw away extra System Folders (ones without an icon on them). The System Folder that your computer is using has a small computer icon on it.

System Folder

- Check for viruses on all your disks, using a virus-detection program. Eliminate any viruses the program finds.

If a problem recurs when you are using a particular application, try the following:

- Consult the documentation that came with the application to make sure you are using it correctly.
- Check for multiple copies of the application on your hard disk. If you have more than one copy, select each one and choose Get Info from the File menu to check the application's version number. Keep one copy of the latest version and throw away all other copies.
- Reinstall the application from a known good source such as the application's original disks.
- Increase the application's memory. Quit the application, select its icon, choose Get Info from the File menu, and type a larger number in the Preferred Size box.
- Contact the manufacturer of the application or the place where you bought it to find out whether the application contains software errors or "bugs" and whether an upgrade is available.
- Check that the application is compatible with the version of system software that you are using. (See the application's documentation, or contact the manufacturer of the application or the place where you bought it.)
- Make sure your control panels and system extensions (especially any that you recently added) are compatible with your applications. See "Checking Your System Extensions" in Chapter 13.

An application program won't open.

- The application program may already be open. Check the Application menu to see which applications are running.
- There may not be enough memory available to open the application. Quit any applications you're not using and try again. If that doesn't work, try restarting the computer.
- If the application is on a floppy disk, make sure the disk is unlocked. (You unlock a disk by sliding the tab at the corner of the disk so that it covers the hole.)
- The application may be damaged, or it may not be compatible with PowerPC technology. Check to make sure the software is PowerPC compatible, and install it from a known good source (such as the application's original disks).
- Check that the application is compatible with the version of system software that you are using. (See the application's documentation, or contact the manufacturer of the application or the place where you bought it.)

You can't open a document, or you see a message that an application program can't be found.

The document may have been created with an application that is not on your hard disk, or with a different version of the application.

- Try starting an application that you think might be able to open the document. Then choose Open from the application's File menu to open the document. For more information, see the documentation that came with the application.
- Purchase and install the correct software to use the document, or find out if the creator of the document can convert it to a form that one of your applications can use.
- Rebuild your desktop. For instructions, see "Rebuilding Your Desktop" in Chapter 13.
- Don't try to open the files in your System Folder. Most of the files in your System Folder are used by your computer for internal purposes and are not intended to be opened.
- If the document is from a DOS or Windows computer, read the next section.

You experience problems using a document from a DOS or Windows computer.

If you can't open a DOS document using a Macintosh application, try the following:

- Open the document from within the application by choosing Open in the application's File menu.
- Use the PC Exchange control panel to specify which Macintosh application will open the document. (To find PC Exchange, choose Control Panels in the Apple [ ] menu.)

If a DOS document is displayed incorrectly, or you see strange codes or characters in the document, try one of the following:

- Your application program may have special procedures for opening and saving documents with different file formats. See the information that came with your application, or call the application's publisher.
- Try opening the document in another application.

Note: Some characters that can be displayed on the Macintosh are not accurately displayed on DOS computers.

For information about working with DOS or Windows documents on your Macintosh, see Mac OS Guide, available in the Guide (?) menu.

A file can't be thrown away.

- The file may be locked. Select the file's icon, choose Get Info from the File menu, and click the Locked checkbox to remove the X. You can delete locked files that are in the Trash by holding down the Option key while you choose Empty Trash from the Special menu.
- An application program may be using the file. Close the file or quit the application.
- If the file is on a floppy disk, the disk may be locked. Unlock the disk by sliding the tab so that it covers the hole at the corner of the disk.
- The file may be in a shared folder that can't be changed. You can throw away the file by turning off file sharing temporarily (click Stop in the Sharing Setup control panel). Or you can select the shared folder, choose Sharing from the File menu, and click the box labeled either "Can't be moved, renamed, or deleted" or "Same as enclosing folder" to remove the X.

You see a message that your application program can't be opened because a file can't be found.

Macintosh applications designed specifically for the PowerPC microprocessor (also called "native" applications) use special files called "shared libraries." Any necessary shared libraries should be installed automatically when you install these special Macintosh applications.

Follow the directions that came with your application to reinstall it. If the shared library is still missing, contact the software application's manufacturer for assistance.

You experience problems using an older Macintosh application.

Some older Macintosh applications are not completely compatible with Macintosh computers that have the PowerPC microprocessor.

- Open the Memory control panel (in the Control Panels folder available from the Apple [ ] menu) and turn off Modern Memory Manager.
- If that doesn't work, contact the application's publisher to see if an upgrade is available.

A window has disappeared.

- Another open window may be covering the one you're looking for. Move, resize, close, or hide windows until you see the one you want.
- The application the window is associated with may be hidden. Choose Show All from the Application menu and then click the window you want, or choose the application from the Application menu.
- Look to see if just the window's title bar is showing. If it is, double- or triple-click on the title bar. If the window still doesn't open, double- or triple-click again while holding down the ⌘, Option, or Control key (try each combination of keys and clicking).

  Note: This problem occurs because a control panel called WindowShade is set to shrink windows so just the title bar is showing or expand them to their original size. To adjust the WindowShade settings, open the WindowShade control panel. (To find WindowShade, choose Control Panels in the Apple [ ] menu.)

Problems with icons

Some icons look different from usual.

- There may be a problem with the information that the computer uses to keep track of files. To fix this problem, you need to rebuild the desktop. For instructions, see "Rebuilding Your Desktop" in Chapter 13.
- You may be using a file-compression program to save space on your hard disk. Some compression programs change the appearance of icons.

An icon is blinking in the menu bar.

- An application needs attention. Press the blinking icon to open the Application menu, then choose the application whose icon is blinking (it may have a diamond by its name). Respond to any messages on the screen. If it's not clear what you should do, consult the documentation that came with the application.

Problems with CD-ROM discs and drives

A CD-ROM disc icon does not appear on the screen.

- If you reinstalled the CD-ROM software, make sure to restart your computer afterward.
- Make sure that the Apple CD-ROM extension is turned on in the Extensions Manager control panel. (To find the Extensions Manager control panel, choose Control Panels in the Apple [ ] menu.) Then restart your computer.

The computer keeps asking you to reinsert a CD-ROM disc after you've ejected it.

- An application program or document from the CD-ROM disc is still open and is "looking for" the disc. Reinsert the CD-ROM disc and close the documents or quit the application programs that are open on the disc. (Open the Application menu in the upper-right corner of your screen and make sure that the Finder is the only application listed. If not, select one of the other application programs and then choose Quit from the File menu. Do this for any other applications listed in the Application menu.) Then eject the CD-ROM disc by selecting its icon and choosing Put Away from the File menu or by dragging the CD-ROM disc's icon to the Trash.
- You may not have properly ejected the CD-ROM disc. To eject the disc properly, reinsert it, select the CD-ROM disc icon, and choose Put Away from the File menu. (You can also drag the CD-ROM disc's icon to the Trash.) If you eject a CD-ROM disc by choosing Eject Disk from the Special menu, the computer keeps its memory of the CD-ROM disc and asks you to reinsert it so you can use it.

Your computer starts up and you see large folder-shaped areas, containing labeled pictorial buttons, instead of the usual Macintosh desktop.

- Your computer may have started up from a CD-ROM disc containing At Ease, an alternative to the Macintosh desktop. You need to have the Macintosh desktop on your screen before you can use any of the software installation instructions in this manual.

  To return to the Macintosh desktop, choose Shut Down from the Special menu. After your computer has shut down, start it up again and then immediately press the Stop/Eject button of your CD-ROM drive to open the drive door. Remove the CD-ROM disc and gently close the door. Your computer finishes starting up.

  Note: To avoid having the computer start up from a CD-ROM disc, remember to remove any disc from the drive before you shut down your computer.

The door of your CD-ROM drive won't open.

If a CD-ROM disc icon appears on your screen:

- Drag the disc icon to the Trash, or select it and choose Put Away from the File menu. (*Note:* You won't lose information on the CD-ROM disc by dragging its icon to the Trash. *Don't* select the disc icon and then choose Eject Disk from the Special menu.)

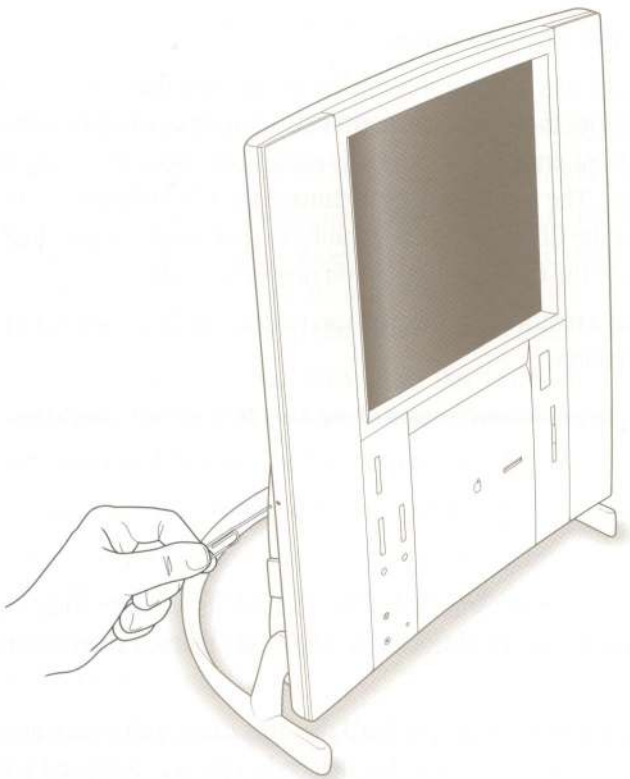
  If the AppleCD Audio Player is active, choose Eject CD from the File menu or click the Eject button in the AppleCD Audio Player window.

  If you see a message that a disc can't be put away because it is being shared, turn off file sharing in the Sharing Setup control panel in the Apple (🍎) menu, then try again to put away the disc.

If no CD-ROM disc icon appears on your screen:

- Restart your computer. Immediately after the startup sound, press the Stop/Eject button of your CD-ROM drive to open the door.

- If the door doesn't open, do the following: Locate the small pinhole on the left side of the computer, insert the end of a large straightened paper clip firmly and horizontally into the pinhole, and push gently until the door is released. Do not force the door open; wait until the paper clip has released it to be sure you don't break the door.



If neither of these suggestions works, your CD-ROM drive may be damaged. Consult the service and support information that came with your computer for information on contacting an Apple-authorized service provider or Apple for further assistance.

Your computer won't restart, and there may or may not be a CD-ROM disc in the CD-ROM drive.

- Your computer may be trying to start up from a CD-ROM disc. Press the Stop/Eject button of your CD-ROM drive to open the door, and remove the CD-ROM disc. Close the door, then restart your computer.

Your CD-ROM disc is vibrating in the CD-ROM drive.

- Some CD-ROM disc labels have artwork that is noticeably thicker on one side than the other and can cause the disc's weight to be slightly off-center. This uneven distribution of weight coupled with the high rotation speed of your CD-ROM drive can occasionally cause some discs to wobble in the drive and make your computer vibrate. The vibration doesn't damage the CD-ROM disc or the computer. If you can feel or hear that the CD-ROM disc is vibrating in the computer, you don't need to do anything special; continue to use the CD-ROM disc as you normally would.

  Note: If you use a CD-ROM disc with a removable label, you can remove the label before inserting the disc to see if that will prevent vibration.

You insert a CD-ROM disc, but its icon doesn't appear on the Macintosh desktop.

- Make sure that the disc label is facing out and the disc is centered and pressed firmly into the drive.
- Make sure the door is closed all the way.
- Try restarting your computer.
- Make sure that the Apple CD-ROM extension is turned on in the Extensions Manager control panel. (To find the Extensions Manager, choose Control Panels in the Apple [ ] menu.) Then restart your computer.
- Try starting your computer from the system software CD-ROM disc that came with your computer; insert the CD and restart while holding down the C key. (For detailed steps, see "Starting Up From the System Software CD-ROM Disc" in Chapter 13.) If the hard disk icon appears on the desktop but the CD-ROM disc icon doesn't appear, then there may be a hardware problem with your CD-ROM drive. If the CD-ROM disc icon appears above the hard disk icon, reinstall your CD-ROM software. The easiest way to do this is by reinstalling your system software, following the instructions in "Installing System Software" in Chapter 13.

Your computer displays the message "This is not a Macintosh disk: Do you want to initialize it?" when you insert a CD-ROM disc in the CD-ROM drive.

- Make sure that the Foreign File Access extension is installed and turned on in the Extensions Manager control panel. (To find the Extensions Manager, choose Control Panels in the Apple [ ] menu.) Then restart your computer.
- The disc may use a format that the Macintosh cannot recognize. Ask the disc's manufacturer for a disc that a Macintosh can recognize.

Your computer ejects a CD-ROM disc without giving you any error message.

- Make sure the disc is centered and firmly in place, and the disc label is facing out.
- The disc may need to be cleaned. (See "Handling CD-ROM Discs" in the section "Handling Your Computer Equipment" in Appendix A.) If there are visible scratches on the shiny side of the disc, you may be able to remove them with a CD-ROM disc polishing kit (available from an audio CD dealer). If the scratches can't be removed, you need to replace the disc.
- The disc may be damaged. Try another disc in the drive, and try the original disc in another drive. If the original drive reads other discs or if the original disc also doesn't work in another drive, the disc is probably damaged. You need to replace it.

You can't open a document on a CD-ROM disc.

- Try starting an application that you think might be able to open the document. Then choose Open from the application's File menu to open the document.
- Read the manual that came with your CD-ROM disc. Some discs come with software that you need to install before using the disc.

You can't save changes you make to information on a CD-ROM disc.

- A CD-ROM disc is a read-only medium. This means that information can be read (retrieved) from it, but not written (stored) on it. You can save the changed information on a hard disk or floppy disk.

Problems using ISO 9660 or High Sierra discs

You cannot access files on a CD-ROM disc that uses the ISO 9660 or High Sierra format.

- Discs in the ISO 9660 and High Sierra disc formats have version numbers attached to filenames. Some application programs need these version numbers in order to work with files. To make the version numbers available to applications on your computer, follow these instructions.

  Drag the CD-ROM disc icon to the Trash. When the door opens, hold down the Option key and push the door closed. Continue to hold down the Option key until you see the disc's icon on the desktop. The application you are using should now be able to locate filenames on that CD-ROM disc.

- Make sure that Foreign File Access, ISO 9660 File Access, and High Sierra File Access files are present in the Extensions folder in the System Folder on your hard disk. If these files are not present, reinstall your CD-ROM software. The easiest way to do this is by reinstalling your system software, following the instructions in "Installing System Software" in Chapter 13.

Problems playing audio CDs

You don't hear any sound when you play an audio CD or an audio track on a CD-ROM disc using the AppleCD Audio Player.

- If you have headphones or speakers connected to the computer, make sure they are firmly connected. Make sure the volume control on your headphones or speakers is not turned down too low.
- If you do not have headphones or speakers connected to the computer, make sure that nothing else is plugged into the computer's sound output port (🎧).
- If you are using a CD-ROM disc over a network, you won't be able to hear the audio portion.
- Make sure the volume is turned up in the AppleCD Audio Player. With the application open, drag the volume control slider up, use the volume controls on your computer, or press the Up Arrow key on your keyboard.
- The CD may have been paused. Click the Play/Pause button in the AppleCD Audio Player once or twice.

While playing an audio track on a CD-ROM disc that combines audio tracks and data, you double-click the disc icon and the audio track stops playing.

- Some CD-ROM discs include tracks in the music CD format (like the tracks on regular music CDs) and other data. On such discs, you can't open data files and listen to audio tracks at the same time.

You are unable to record sound from an audio CD.

- You may need to reset the sound options in the Monitors & Sound control panel. Refer to the information on sound in Mac OS Guide, available in the Guide (?) menu.

Problems using Photo CDs

You insert a Photo CD disc, but its icon doesn't appear on the desktop.

- Reinstall the CD-ROM and QuickTime software. The easiest way to do this is by reinstalling your system software, following the instructions in "Installing System Software" in Chapter 13.

Your computer does not display color icons for individual images on a Photo CD.

- Your computer may be low on memory. To view color icons, restart your computer and then reopen the Photos folder. See Mac OS Guide, available in the Guide (?) menu, for more information on managing memory.

After you open an image file on a Photo CD, the image is scrambled, colors are displayed incorrectly, or no image appears in the window.

- The application you are using may not be designed to work with large (high-resolution) image files. You can open the image with another application or you can assign more memory to the application. See Mac OS Guide, available in the Guide (?) menu, for more information on managing memory.

After you open an image on a Photo CD, your system "freezes" and does not respond to any input, or you have a "bomb" message on your screen.

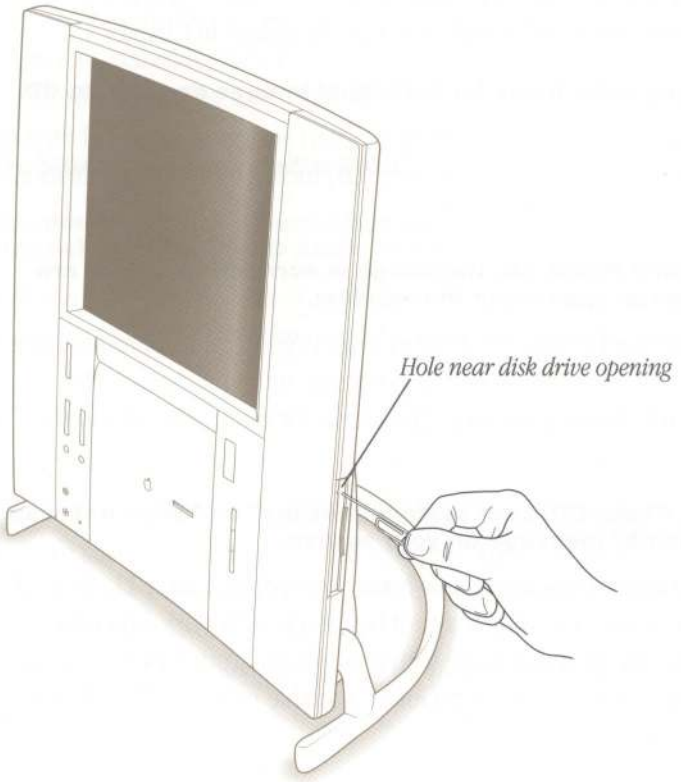
- Restart your Macintosh. (Instructions for restarting your computer are in Chapter 11, "Start Here If Trouble Occurs.") The application you are using may not be designed to work with large (high-resolution) image files. You can open the image with another application or you can assign more memory to the current application. See Mac OS Guide, available in the Guide (?) menu, for more information on managing memory.

Problems with floppy disks and floppy disk drives

You can't eject a floppy disk.

If you can't eject a floppy disk in the usual way, by selecting the disk's icon and choosing Put Away from the Special menu or by dragging the disk's icon to the Trash, try the following in order:

- Hold down the ⌘ and Shift keys and press the number 1 key on your keyboard.
- Shut down the computer. If the disk isn't ejected, hold down the button on your trackpad or other pointing device while you turn the computer on again.
- Locate the small hole near the disk drive's opening, and carefully insert the end of a large straightened paper clip into it. Push gently until the disk is ejected. Do not use excessive force.



If none of these solutions works, take the computer or disk drive to your Apple-authorized service provider to have the disk removed.

You can't save or copy files onto a floppy disk.

- The disk may be locked. Unlock it by sliding the tab at the corner of the disk so that it covers the hole.
- The disk may be full. Throw away items on the disk that you no longer need, or save the files on a different disk.
- The disk may be damaged. Test it with Disk First Aid, following the instructions in "Repairing a Damaged Hard Disk or Floppy Disk" in Chapter 13.
- The disk drive may be damaged. To see if this is the problem, try saving or copying files onto another floppy disk. If you are still unsuccessful, the drive may need professional repair. Consult the service and support information that came with your computer for information on contacting an Apple-authorized service provider or Apple for further assistance.

After inserting a floppy disk, you see the message, "This is not a Macintosh disk: Do you want to initialize it?" or "This disk is damaged: Do you want to initialize it?"

- The floppy disk may be new and may not be initialized. If you're sure the disk has never been used, click Yes.

▲ **Warning** Clicking Yes erases all data that may be on the disk. Therefore, only click Yes if you're sure the disk contains no important data. If you're not sure, click No. ▲

- The disk may have been formatted for use on DOS/Windows systems, or some other kind of computer. If so, see the tips that follow.
  - Click No in the dialog box asking you if you want to initialize the disk.
  - Make sure the PC Exchange control panel is available. (To find PC Exchange, choose Control Panels in the Apple [ ] menu.) Also, make sure PC Exchange is turned on in the Extensions Manager control panel. For more information about Extensions Manager, see the information about managing extensions in Mac OS Guide, available in the Guide (?) menu.

- When formatting floppy disks on a DOS computer for use in a Macintosh, you need to format standard double-sided disks as 720K disks and high-density disks as 1440K disks. Double-sided disks formatted in 1440K format and high-density disks formatted in 720K format may not work in a Macintosh.

  If you think a floppy disk formatted on a DOS computer might have a format that doesn't work in a Macintosh, use a DOS computer to copy the contents of the disk onto a properly formatted disk.

- The floppy disk may be too warm or too cold to be read. A cold disk will warm up after a few minutes in a warm room. You can cool an overly warm disk by placing it in a shady, cool place.
- The disk drive may be damaged. To see if this is the problem, click No to eject the disk; then insert the disk into another drive, if you have one. If you still see the message, the floppy disk may be damaged. If the disk icon appears on the desktop when the disk is in another drive, one of the drives may be damaged.

  Sometimes a drive can be damaged because its heads are out of alignment. You can still insert a disk into such a drive and copy information onto the disk. However, when you try to use the disk in a different drive the different drive can't read (find and display information from) the disk. Try the disk in three or four drives. If more than one drive can't read the disk, it is likely that the drive that copied information onto the disk is damaged. If only one drive can't read the disk, then that drive is probably the damaged one.

- If none of these suggestions works, the floppy disk is probably damaged. First use a disk recovery program to copy the data from your damaged disk onto a good disk. For instructions, see the documentation that came with the disk recovery program. Then, use Disk First Aid to repair the damaged floppy disk, following the instructions in Chapter 13, "Techniques for Diagnosing and Solving Problems."

The computer keeps asking you to reinsert a floppy disk after you've ejected it.

- An application program or document from the floppy disk is still open and is "looking for" the disk. Reinsert the disk and close the documents or quit the application programs that are open on the disk. (Go the Application menu in the upper-right corner of your screen and make sure that the Finder is the only application listed. If not, select one of the other application programs and then choose Quit from the File menu. Do this for any other applications listed in the Application menu.) Then eject the floppy disk by selecting its icon and choosing Put Away from the File menu.
- You may not have properly ejected the floppy disk. To eject the disk properly, reinsert it, select the floppy disk icon, and choose Put Away from the File menu. If you eject a floppy disk by choosing Eject Disk from the Special menu, the computer keeps the floppy disk in its memory and asks you to reinsert it.

Problems with hard disks

The computer won't start up from the internal hard disk, or the hard disk icon doesn't appear on the desktop.

- There may be a temporary software problem. Turn off the computer, wait at least 10 seconds, and then turn it on again.
- There may be a problem with your startup disk or with its system software. See "Testing Your Hard Disk" in Chapter 13.

The computer is using the wrong disk as a startup disk.

- Open the Startup Disk control panel and make sure the correct disk is selected. Then restart the computer. (To find the Startup Disk, choose Control Panels in the Apple [ ] menu.)
- If you're trying to start up from an external hard disk, your computer may be having a problem recognizing the disk, which is a SCSI device. Refer to both the manual that came with the hard disk and Chapter 9, "Connecting Additional Equipment," which has information on the proper way to connect SCSI equipment and assign SCSI ID numbers.
- There may be a problem with the information stored in the area called *parameter RAM (PRAM)*. Reset the PRAM by following the instructions in "The Computer Makes an Unusual Sound at Startup," earlier in this chapter.

Problems with the trackpad or keyboard

The pointer (↖) doesn't move when you move your finger on the trackpad.

One of the following situations is probably the cause.

- The trackpad or keyboard is not connected properly.

  Turn off the computer by pressing the Power key (◁) and then press the Return key to choose Shut Down. If that doesn't work, press the power button on the back of the computer. With the computer off, check that the trackpad and keyboard cables are connected properly. Then start up the computer again.

  Important Do not connect or disconnect the trackpad while the computer is turned on. You may damage your computer.

- Signals from the trackpad are not reaching the computer, either because the trackpad needs cleaning or because there is something wrong with it.

  Clean the trackpad according to the instructions in Appendix A, "Health, Safety, and Maintenance Tips."

  If you have a mouse or other pointing device, turn the computer off and then try connecting and using the alternative pointing device. If the alternative device works, there is probably something wrong with the trackpad. Consult the service and support information that came with your computer for instructions on how to contact an Apple-authorized service provider or Apple for assistance.

- There is a software problem. Try the following:

  Press ⌘-Option-Esc to quit the application program in use when the problem occurred. If this works, you can save the documents open in other applications before restarting.

  Restart your Macintosh. For instructions, see Chapter 11, "Start Here If Trouble Occurs."

- Follow the suggestions in the problems related to the computer "freezing," earlier in this chapter.

The pointer (↖) sticks or jumps when you use the trackpad.

- Make sure to use only one finger and that your finger is dry.

Typing on the keyboard produces nothing on the screen.

One of the following is probably the cause:

- You haven't selected any text or set the insertion point (I).

  Make sure the application you want to type in is the active application. Then place the pointer (↖) in the active window and click to set an insertion point (I) or drag to select text (if you want to replace the text with your typing).

- If the computer beeps every time you press a key, Easy Access is probably turned on.

  Use the Extensions Manager control panel in the Control Panels folder in the Apple (🍎) menu to turn off Easy Access. For more information about Extensions Manager, see the information about managing extensions in Mac OS Guide, available in the Guide (?) menu.

- The keyboard is not connected properly.

  Turn off the computer by pressing the power button on the back of the computer. With the computer off, check that the keyboard cable is connected properly at both ends.

- Some system software features are turned on that affect the way the keyboard works.

  Open Easy Access from the control panels listed under the Apple (🍎) menu and turn off Sticky Keys, Slow Keys, and Mouse Keys.

- There is a software problem.

  Restart your Macintosh. For instructions, see Chapter 11, "Start Here If Trouble Occurs."

  Check the startup disk and application program you were using when the problem occurred. To check that the applications and the system extensions you're using are compatible with the system software, restart while holding down the Shift key; this temporarily turns off all system extensions. If your computer works normally after you do this, use the Extensions Manager control panel to turn on extensions and control panels one at a time. Restart after you turn on each extension. This procedure should identify incompatible extensions and control panels that may be causing the problem. (If you just added new software to your computer, its system extension is the most probable cause of the problem.) For detailed instructions, see "Checking Your System Extensions" in Chapter 13.

  If the problem recurs, you may need to reinstall system software. See "Installing System Software" in Chapter 13.

- The keyboard is damaged.

  If you have access to another keyboard, try using it instead. (Turn the computer off before connecting it.) If the new keyboard works, there is probably something wrong with the one you replaced.

If none of these procedures solves the problem, consult the service and support information that came with your computer for instructions on how to contact an Apple-authorized service provider or Apple for assistance.

Problems with your computer's speed and performance

Your computer's performance decreases.

- If you notice a decrease in your computer's speed and general performance after you install a control panel or system extension, it may be because the software is not compatible with either Macintosh computers built with the PowerPC microprocessor or with other system extensions.

  To find out if a system extension or control panel is the problem, follow the instructions in the section "Checking Your System Extensions" in Chapter 13.

- Use the Memory control panel to turn off virtual memory. (To find the Memory control panel, choose Control Panels in the Apple [ ] menu.) For more information on virtual memory, see the information about memory in Mac OS Guide, available in the Guide (?) menu.

  Note: If you turn on both virtual memory and RAM disk in the Memory control panel, don't set both of them at or near their maximum values. Doing so can result in unpredictable or reduced performance by your computer. (RAM disk uses random-access memory, or RAM, as if it were a hard disk.)

- If you still do not notice an improvement, you may want to reinstall system software on your startup hard disk. See "Installing System Software" in Chapter 13 for instructions.

- If you typically use several application programs at the same time, your computer's performance will increase if you install more random-access memory (RAM). See Chapter 10, "Installing Expansion Cards and Memory."

Your computer isn't performing as fast as you'd like.

If, after trying the tips in the previous section, your computer still isn't performing as fast as you'd like, try these suggestions. Each one will make only a small difference in your computer's speed, but if you try them all, you'll notice the improvement.

- Open the Memory control panel in the Control Panels folder in the Apple (🍎) menu; then make these changes:
  - In the Disk Cache section, increase the Cache Size.
  - In the Modern Memory Manager section, click On.
  - In the Virtual Memory section, click Off if you haven't already done so.
- Open the Keyboard control panel in the Control Panels folder; then make these changes:
  - Set the Key Repeat Rate to Fast.
  - Set the Delay Until Repeat to Short.
- Turn off Menu Blinking. Open the General Controls control panel in the Control Panels folder; then click Off in the Menu Blinking section.
- If you don't need to see thousands or millions of colors on the screen, reduce the color depth. Open the Monitors & Sound control panel in the Control Panels folder; then click 256 in the Color Depth section.
- Increase the speed of trackpad tracking. Open the Trackpad control panel in the Control Panels folder; then set Tracking Speed to Fast.
- Make sure your computer is not calculating folder sizes. Open the Views control panel in the Control Panels folder; in the List Views section, make sure the checkbox next to "Calculate folder sizes" is *not* checked.
- If your computer is not connected to a network, turn off AppleTalk. Open the Chooser in the Apple (🍎) menu; in the AppleTalk section, click Inactive.

Your screen displays a right-angle bracket prompt (>) instead of the regular Macintosh desktop.

Your computer has tried to launch a "debugging" application, but could not find one on your hard disk. Debugging applications are programs that software developers use to locate and fix problems in computer code. If you do not have a debugging application installed, your screen displays a right-angle bracket prompt (>). To return to the desktop, press G and then press Return.

Your computer's clock begins to keep time inaccurately

If your clock begins to keep time inaccurately, have an Apple-authorized service provider replace the battery. The service provider will dispose of the battery according to the local environmental guidelines. Consult the service and support information that came with your computer for instructions on how to contact an Apple-authorized service provider or Apple for assistance.

▲ **Warning** Do not attempt to replace the clock battery yourself. If your clock begins to lose accuracy, have an Apple-authorized service provider replace the battery. The service provider will dispose of the battery according to the local environmental guidelines. ▲

The computer makes unusual sounds.

- An application may need your attention. If an icon is blinking in the menu bar, open the menu, choose the application whose icon is blinking (it may have a diamond by its name), and take the necessary action.
- Open the Easy Access control panel (if it is installed on your computer) and check whether any features are turned on.
- Select a different system sound in the Monitors & Sound control panel.
- If the sounds are regular or melodic, they may be caused by interference from electrical equipment. Move the computer farther away from any such equipment.
- Make sure that the covers on the speaker grilles (to the left and right of the screen) are fastened.

See also "The Computer Makes an Unusual Sound at Startup" in the section "Problems Turning On or Starting Up Your Computer," earlier in this chapter.

Problems with error messages

When trying to open or move a font file, you see an error message.

- The font may be in use by an application. Try quitting any open applications.
- The font file may be damaged. To remove damaged font files, follow these steps:
  1. Drag the Fonts folder out of the System Folder.
  2. Restart the computer.
  3. Open the Fonts folder that you dragged out and drag undamaged fonts to the System Folder icon. Click OK in the dialog box.
  4. Throw away the old Fonts folder.
  5. For the font that was damaged, reinstall the undamaged font from the original font disk.

You see an error message that doesn't make sense, such as an error with a number code.

- The number codes in error messages are used in software development. Sometimes they can help a technician narrow down the source of a problem. However, the codes are usually too general or technical in nature to help you diagnose a problem yourself.

  When you see an error message, write it down exactly, in case you need to speak with a technical support representative.

Problems with your printer

The following suggestions should work for all printers. (*Note:* Also refer to the manual that came with your specific printer.)

- Make sure that the printer driver for your printer is turned on in the Extensions Manager control panel in the Control Panels folder in the Apple (🍎) menu. To find out the name of the printer driver—for example, *LaserWriter*—refer to the documentation that came with your printer.

- Check your printer settings in the Chooser (in the Apple [ ] menu), making sure you have selected the correct printer. If you are using a printer that is shared by other computer users (a printer on a local network), make sure that AppleTalk (in the lower-right corner of the Chooser) is active. If you are using your own printer (a serial printer connected to your computer), make sure that AppleTalk is inactive.
- Turn off the computer and printer and check the printer cable connections.
- If none of these suggestions solves the problem, you may need to reinstall the printer driver that came with your printer. Refer to the manual that came with your printer. (See the following important note.)

Note: If you have an Apple printer, install the most recent driver available.

Nothing happens, or an error message appears when you try to print.

- There may not be enough memory for printing. Try the following:
  - Quit the application immediately after sending the Print command to free up memory for printing.
  - Increase the amount of memory for the desktop printer icon; select it, choose Get Info from the File menu, and type a larger number in the Preferred Size box.
  - Reduce the amount of memory the application uses.
- Make sure the printer is turned on. Some printers need to warm up for a few minutes after you turn them on.
- The printer may be out of paper or may need attention. Check the printer status lights and any messages on your screen.
- Open the desktop printer icon and check for status messages.
- Reinstall your printer software.

Problems with networks and file sharing

If you are having problems using a network or file sharing, try the following before attempting further solutions:

- Make sure the network is working by opening the Chooser and checking for the shared disks and printers you usually use.
- Make sure that AppleTalk is turned on in the Chooser.
- Open the AppleTalk and TCP/IP control panels and make sure the settings are correct. For more information, see Chapter 6, "Connecting Your Computer to a Network."
- Make sure that all the network software is installed. The AppleTalk and TCP/IP control panels should be in the Control Panels folder, and the Network and AppleShare extensions should be in the Extensions folder. If you want to use file sharing, the Sharing Setup control panel should be in the Control Panels folder, and the File Sharing extension should be in the Extensions folder. If any of these items is missing, reinstall the system software according to the instructions in "Installing System Software" in Chapter 13.

You can't select Ethernet in the AppleTalk or TCP/IP control panel, or it doesn't appear in the control panels.

- You must have an Ethernet card in the computer's communication card slot for Ethernet to appear in the AppleTalk and TCP/IP control panels. Make sure you have a card and that it has been properly installed.
- You can only select Ethernet when the network cable is connected properly. Shut down the computer and check the Ethernet connection.
- You can only select Ethernet when the network is functioning. If you suspect that the network is down, notify your network administrator.
- If you have an Apple Ethernet CS II Twisted Pair Card, the status light near the Ethernet port will light when a proper network connection is made. If the status light doesn't come on, the network is not responding. Check with your network administrator for help.

The computer, printer, or other device you want to connect to doesn't appear in the Chooser.

- Make sure the computer or other device you're trying to connect to is turned on, functioning, and connected to the network.
- The device you want to connect to may be in a different AppleTalk zone. Look for the device in other zones listed in the Chooser.
- Make sure your network connection is set correctly. Open the Apple (🍎) menu and choose Control Panels, then open the AppleTalk control panel. Choose your network connection (usually LocalTalk or Ethernet).
- You can only select a networked device when the network is functioning. If you suspect that the network is down, notify your network administrator.
- Make sure file sharing is active on the computer you're trying to connect to. (That computer's Sharing Setup control panel should say that file sharing is on.)

You connected to another computer, but the shared disk you want to use is not available.

- You may already be connected to the shared disk. Check for its icon on your desktop.
- You may not have the access privileges you need to use the shared disk. Ask the network administrator or the owner of the shared item to give you access. See file sharing in Mac OS Guide, available in the Guide (?) menu, for information.

You connected to another computer, but you can't see any files.

- Make sure that files are being shared on the other computer. The File Sharing Monitor control panel on that computer lists the items being shared.
- Make sure you have the access privileges you need to view the files. Ask the network administrator or the owner of the shared item to give you access. See file sharing in Mac OS Guide, available in the Guide (?) menu, for information.

A message says that a disk can't be ejected because it's being shared.

- When you have file sharing turned on, you can't eject disks (other than floppy disks) that were connected to your computer when you started it up. You can eject the disk by turning off file sharing in the Sharing Setup control panel. After you've ejected the disk, you can turn file sharing back on.

A message says that file sharing can't be turned on.

- Make sure AppleTalk is turned on in the Chooser.
- Make sure you have at least 1 MB of available space on your hard disk.
- Some disk-formatting programs don't work with file sharing. If you use such a program, contact the manufacturer of the program or the place where you bought it for compatibility information.
- There may be a problem with some of the information your computer uses to start up file sharing. Follow these steps in order until the problem is solved:

  1. Open the Sharing Setup control panel and enter new information in the Owner section. Then try again to turn on file sharing.
  2. Remove the File Sharing folder from the Preferences folder (inside the System Folder). Then restart the computer and try to turn on file sharing.
  3. Reset the PRAM by following the instructions in "The Computer Makes an Unusual Sound at Startup," earlier in this chapter. Afterward, make sure to select the correct network type in the AppleTalk control panel.
  4. Remove the Users & Groups data file from the Preferences folder (inside the System Folder). Restart the computer.
  5. Reinstall system software.

A message says that an item can't be shared.

- Make sure you have at least 1 MB of space available on your hard disk.
- Some removable storage devices can't be shared. Check the manufacturer of the device or the place where you bought it for more information.
- Some disk-formatting programs don't work with file sharing. If you use such a program, check with the manufacturer of the program or the place where you bought it.

The file sharing section doesn't appear in the Sharing Setup control panel.

- You may have turned off AppleTalk or file sharing using the Extensions Manager control panel. Turn them back on.
- If the file sharing and networking software is not in your System Folder, reinstall file sharing and networking software by reinstalling system software. For more information, see "Installing System Software" in Chapter 13.

You can't open a shared disk or folder.

- You may not have the access privileges needed to use the disk or folder. Ask the network administrator or the owner of the shared item to give you access.
- Check with the owner of the item to make sure you are entering your name exactly as specified by the owner (including spaces and capitalization) and try again.

Problems using the microphone

You can't record sound using an external microphone or the microphone built into your computer.

- If you're using an external microphone to record, make sure your sound input source is set to External Microphone. Open the Apple (🍎) menu and choose Control Panels, then open the Monitors & Sound control panel. Click the Sound icon and choose External Microphone from the Sound Input pop-up menu.
- If you're using your computer's built-in microphone to record, make sure your sound input source is set to Internal Microphone. Open the Apple (🍎) menu and choose Control Panels, then open the Monitors & Sound control panel. Click the Sound icon and choose Internal Microphone from the Sound Input pop-up menu.

For additional help, see the information about sound in Mac OS Guide, available in the Guide (?) menu.

Problems listening to the radio

You can't find the Apple FM Radio application.

If the Apple FM Radio application is not anywhere on your hard disk, you need to install it from your system software CD. See "Performing a Custom Installation" in Chapter 13.

You don't hear anything when you open the Apple FM Radio application.

- Be sure your FM antenna is securely connected to the FM port and the antenna is raised high. See Chapter 7, "Sound."
- The radio sound doesn't work if Video or S-Video is selected in the Apple Video Player application (even if that application isn't currently open). Open the Apple Video Player application and choose Show Controls Window from the Windows menu. Click the video screen icon (the second button down on the left). Choose TV as your video source. You can then quit the Apple Video Player application. Now when you open the Apple FM Radio application, you should hear radio.

- Be sure the volume on your computer is turned up. To adjust the volume, use the volume button on the front of the computer, the volume button on the remote control, or the controls in the Monitors & Sound control panel.
- You may need to broaden the signal range or strength. Make sure the Apple FM Radio application is active. Open the Options menu, choose Signal Range or Signal Strength, and choose "DX" for Signal Range and "All Stations" or "All Except Weakest" for Signal Strength.

The reception is poor.

- Adjust the FM antenna. Be sure it is securely connected to the port and raised high.

The remote control doesn't work.

- Make sure the remote control has a battery, or try changing the remote control's battery.
- Try moving closer to your computer. If you are already very close to the computer, point the remote control directly at the remote control receiver on the front of the computer.
- The remote control won't work for any application if the Disable Remote Control option is selected in Apple Video Player. Open Apple Video Player and choose Preferences from the Setup menu. Deselect the Disable Remote Control option (click to remove the X in the checkbox).

You can't switch to radio using the remote control, or quit the radio using the remote control.

- There isn't a way to turn the radio on or off using the remote control.

When you click Seek or Auto Add, Apple FM Radio finds either too few or too many stations.

- If Apple FM Radio is finding too few clear stations, adjust the FM antenna while the radio is playing to see if some stations come in clearer.
- If Apple FM Radio is finding "fuzzy" stations when it scans or adds stations, you may need to narrow the signal range or strength. Make sure the Apple FM Radio application is active. Open the Options menu, choose Signal Range or Signal Strength, and choose another setting. See what that does to the Scan and Auto Add features. Experiment with different settings to see which setting eliminates the stations you want eliminated.

Problems watching TV or video

If the Apple Video Player application is not anywhere on your hard disk, you need to install it from your system software CD. See "Performing a Custom Installation" in Chapter 13.

The remote control doesn't work.

- Make sure the remote control has a battery, or try changing the remote control's battery.
- Try moving closer to your computer. If you are already very close to the computer, point the remote control directly at the remote control receiver on the front of the computer.
- The remote control won't work for any application if the Disable Remote Control option is selected in Apple Video Player. Open Apple Video Player and choose Preferences from the Setup menu. Deselect the Disable Remote Control option (click to remove the X in the checkbox).

You can't switch to TV when you press the TV/Mac button on the remote control.

- You may not have selected TV as your video source. Make sure that Apple Video Player is active, then choose Show Controls Window from the Windows menu and click the TV Video Source button.

The Power button on your remote control doesn't work.

- You may have left a dialog box open. Close any open dialog box, then try the Power button again.

You see static or a blank screen when you try to watch TV or video.

- Be sure your video equipment is securely connected to the appropriate video input port and your equipment is turned on.
- Be sure your antenna or cable service is securely connected to the coaxial port on the back of the computer.
- You may have the wrong video source selected. Make sure that Apple Video Player is active, then go to the screen controls in the Controls window and click the appropriate Video Source button.
- Some static may result from poor reception over an antenna, or from problems with cable service. Review the instructions that came with your antenna or cable, or call the supplier for assistance.

The image is too small or it's filled with odd colors.

- The video input standard is set incorrectly. Make sure that Apple Video Player is active, then choose Preferences from the Setup menu and select a different setting.

You see a message that the built-in digitizer cannot display video in the current monitor setting.

- Reduce the number of colors or levels of gray your monitor displays, using the Monitors & Sound control panel or the Control Strip.

The image is too white or too dark.

- Adjust the video screen controls. (Make sure that Apple Video Player is active, then choose Show Controls Window from the Windows menu and click the video screen icon.)
- If you have a VCR connected to your video input card, make sure you're not having a problem with the videotape or the VCR itself. (Connect the VCR back to your TV and play the tape to see if the image is still bad.)
- The voltage output of your video equipment may be too high or too low for the video input card. Therefore, your video equipment may be sending video signals that are too strong (causing a white picture) or too weak (causing a very dark picture) for the video input card. Try connecting different video equipment to the card.

You have a dark or "rolling" picture.

- Adjust the video screen controls. Make sure that Apple Video Player is active, then choose Show Controls Window from the Windows menu and click the video screen icon.)
- If you have a VCR connected to your video input card, make sure you're not having a problem with the videotape or the VCR itself. (Connect the VCR back to your TV and play the tape to see if the image is still bad.)

You don't hear the TV, or you hear the radio instead of the TV.

- Make sure you have quit the Apple FM Radio application. To do so, click the FM Radio window to make it active, then choose Quit from the File menu. (You can watch TV and listen to the radio at the same time, but the radio sound takes precedence.)
- Be sure the volume on your computer is turned up. To adjust the volume, use the volume button on the front of the computer, the volume button on the remote control, or the controls in the Monitors & Sound control panel.

The sound is intermittent or clipped.

- Turn down the volume controls on your video equipment. They may be set too high for the video input card.
- The voltage output of your video equipment may be too high for the video input card. Therefore, your video equipment may be sending signals that are too strong for the video input card. Try connecting different video equipment to the card.

The sound is full of static.

- Adjust the sound controls in the Controls window. (Choose Show Controls Window from the Windows menu and click the sound icon.)
- Turn up the volume controls on your video equipment.

Unexpected things happen when you try to switch modes using a keyboard shortcut.

- If you can switch between TV and computer using the remote control, but have trouble switching using the keyboard, check the hot key by choosing Hot Key from the Apple Video Player Setup menu. Be sure the key combination is not used by one of your other applications. For instance, in most Macintosh applications ⌘-P sends a document to the printer. On the desktop, ⌘-N creates a new untitled folder.

You have a cable service and you can't see any channels above channel 13 (U.S. only).

- Some cable services use HRC cable frequencies instead of standard cable frequencies. If you can't receive channels above channel 13, choose Channel Setup from the Apple Video Player Setup menu and select HRC Cable from the Connection pop-up menu.

You can't see the Names pop-up menu on the video window.

- (U.S. only) You may have the wrong signal source selected. Each signal source (antenna, or standard or HRC cable) has its own channel list and potential list of channel names. Make sure that Apple Video Player is active, then choose Channel Setup from the Apple Video Player Setup menu and make a different choice from the Connection pop-up menu.
- If you had to reset your password because you forgot it, any names you entered earlier for channels were erased. You need to enter the names you want again.

You can't see the volume slider on the video window.

- The video window is too small or too large. Make sure that Apple Video Player is active, then change the size by making a choice from the Windows menu or by dragging the size box.

Your password doesn't work, or you forgot your password.

- Open the Guide menu and choose Apple Video Player Guide, then follow the instructions on invalidating a forgotten password so that you can create another password.

You can't see closed captions when watching a channel or a videotape that provides them.

Note: Closed captions are available only in certain regions.

- The video window must be set to Normal Size or greater to see closed captions. Make sure that Apple Video Player is active, then change the size by making a choice from the Windows menu or by dragging the size box.
- Quit networking or printing applications if they are active. Closed captioning does not work well when networking or printing is active.
- To view a videotape with closed captions, you must connect your VCR to the TV tuner port, not to the video input port.

Problems using the modem

If you are experiencing problems with your modem, try following the general troubleshooting procedures on this page. Also see the information that came with any communications applications you are using.

Double-check your installation.

1. Unplug and reconnect the telephone cord to ensure a good connection. Check all other connections.
2. Open the Express Modem control panel and make sure that the modem is turned on.

   If the On button does not stay selected, or if the control panel does not appear, try reinstalling the Apple Telecom software. See "Performing a Custom Installation" in Chapter 13.

Make sure your modem is communicating with the telephone line.

1. Open the Monitors and Sound control panel and make sure that the volume is set above the lowest mark.

   Increasing volume lets you hear what's going on: there should be a dial tone when you open communications and you should hear the modem dialing telephone numbers.
2. Try dialing your own telephone number.

   If you hear a busy signal, you are properly connected.
3. If you do not hear a dial tone, test your telephone line by connecting a working telephone and cord to the line.

   Plug the telephone into a telephone jack to verify the dial tone. If there is none, the telephone line is the source of the problem. The telephone line may be a digital line, in which case the modem will not work.

4 If you hear a dial tone on your telephone but not through your modem, test your modem's telephone cord by connecting it to the telephone jack and to the telephone.

If there is no dial tone, the telephone cord is the source of the problem.

If you followed steps 1 through 4 and you still don't hear a dial tone, your modem may need to be repaired. Consult the service and support information that came with your computer for information on contacting an Apple-authorized service provider or Apple for further assistance.

▲ **Warning** If your modem needs repair, take it to an Apple-authorized service provider. Do not attempt to repair or reinstall modem hardware yourself. If you do, any damage you may cause to your equipment will not be covered by the limited warranty on your computer. See an Apple-authorized service provider for additional information about this or any other warranty question. ▲

Check to see if your software is properly installed.

- Check to see if the Apple Telecom software is properly installed by watching the bottom of your screen when you restart your computer. The Apple Fax and Express Modem icons should be animated: the paper should emerge from the fax machine on the Apple Fax icon and the buttons on the phone should be pressed on the Express Modem icon.
- Open the Express Modem control panel. If the Express Modem software is installed and a communications application is using the modem, the Modem button in the Express Modem control panel is set to On.

After you follow the general troubleshooting procedures above, check the rest of this section for answers to specific questions. Also refer to the information that came with any communications applications you are using.

You can't connect to a remote fax reception location.

- Resend the fax. If telephone line quality is poor, you may need to send the fax several times.
- You may have trouble sending or receiving a fax at the same time you are transferring files across an AppleTalk network using File Sharing. In this case, do not transfer files while sending or receiving your fax.
- If fax transmission fails, you can choose to resend only the pages not already sent by selecting "Resend only pages not already sent" in the Modem preferences of Apple Fax Preferences.

You aren't receiving incoming calls.

- Make sure that your communications application is set to auto-answer.

  For Apple Fax, make sure that Fax Answering is set to On. For Apple Phone, make sure that Voice Mail in Voice Mail view is set to On. (For more information about Apple Fax or Apple Phone, see Chapter 4, "Connecting Your Computer to a Telephone Line." Check the appropriate setting for auto-answer in your communications application or terminal emulator.
- Open the Express Modem control panel and make sure the "Auto-answer incoming calls" checkbox is selected.

Some of your Fax Documents do not appear in the Apple Fax list.

- Sent and received fax documents are different file types. If you put a received fax into the "Sent Fax Documents" folder, for example, it does not show up in the list.

You see a message that there is not enough memory.

- Quit any applications that you are not currently using.
- Close any windows that you don't need open.
- Try turning off the modem in the Express Modem control panel. Turning off the modem frees up approximately 600K of memory. When an application like Apple Fax needs the modem, it will turn it on again automatically.

  Of course, you should not turn off the modem while it is in use.

Techniques for Diagnosing and Solving Problems

This chapter provides detailed instructions on several techniques you will use to diagnose and fix problems involving system software and hard disks. You will learn how to check your system extensions, start up from your system software CD-ROM disc, test and repair disks, and reinstall system software.

Checking your system extensions

System extensions are files that add features to your system software. Some extensions are incompatible with one another, with certain programs, or with Macintosh computers built with the PowerPC microprocessor. To check whether an extension is causing problems, follow the instructions in this section.

Step 1: Verify the problem

To verify that you have a compatibility problem, follow the steps below.

1 Start up your computer while holding down the Space bar.

Holding down the Space bar opens the Extensions Manager control panel during startup.

2 Release the Space bar when the Extensions Manager control panel opens.

3 Open the Selected Set pop-up menu and choose Mac OS 7.6 Base System.

This turns off all extensions and control panels except those installed with Mac OS 7.6.

4 Close the Extensions Manager to continue startup.

5 When the computer is ready, try the same actions that caused the problem.

If the problem no longer occurs, you probably have an extension or control panel that doesn't work with Mac OS 7.6. Continue with the steps in the next section.

If the problem still occurs, try checking your hard disk for problems with the Disk First Aid utility. You can find Disk First Aid in the Utilities folder on the CD-ROM disc that contains system software. You should also check to make sure that your application programs are compatible with Mac OS 7.6. If the problem only occurs when using a certain program, that program is probably not compatible. Check with the program's manufacturer for information.

Step 2: Test individual extensions and control panels

To test an individual extension or control panel for compatibility, follow the steps below.

1. Start up your computer while holding down the Space bar.

   Holding down the Space bar opens the Extensions Manager control panel during startup.

2. Release the Space bar when the Extensions Manager control panel opens.
3. Turn on the item you want to test by clicking its name to put an X beside it.
4. Close the Extensions Manager to continue startup.
5. Try the same actions that caused the problem.

   If the problem does not occur again, then the item is probably compatible with Mac OS 7.6.

   If the problem occurs again, the item is probably incompatible. Open the Extensions Manager and click the item's name to remove the X.

6. Repeat steps 1 through 5 for each item you want to test.

Testing your hard disk

If you see a message reporting that a disk is damaged or unreadable, you may need to repair the disk.

Try these suggestions first

If you can't start up from a hard disk or you don't see the hard disk icon on the desktop, try the following:

- If the hard disk is internal, shut down your Macintosh, wait at least 10 seconds, and then turn it on again.
- If the hard disk is external, make sure that it is turned on and that its cable is connected firmly; then restart the Macintosh.
- If the hard disk is your startup disk, start up with a different startup disk. (See "Starting Up From the System Software CD-ROM Disc," later in this chapter.)

  If, after you start up from a different disk, your hard disk's icon appears on your desktop, reinstall system software on the hard disk. See "Installing System Software," later in this chapter.
- Check the ID numbers of all SCSI equipment (anything connected to the SCSI port [⟐]) on your computer. For information on setting SCSI ID numbers and terminating a SCSI chain, see both the manuals that came with your SCSI equipment and Chapter 9, "Connecting Additional Equipment."
- If none of these suggestions solves the problem, test the disk by following the instructions in "Testing for Damage on Your Hard Disk," next.

Testing for damage on your hard disk

You can test a hard disk for damage with the Drive Setup program, which is on the system software CD-ROM disc that came with your computer.

1 Start up your computer from the system software CD-ROM disc that came with your computer.

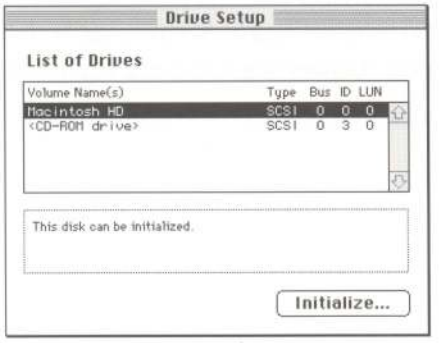
See "Starting Up From the System Software CD-ROM Disc," later in this chapter.

2 Locate the Drive Setup icon and double-click it to open the Drive Setup program.

Drive Setup is usually in the Utilities folder on the system software CD-ROM disc.

Drive Setup

3 In the list of drives, click the disk you want to test.



4 Open the Functions menu and choose Test Disk.

5 When a message tells you that the testing is complete, click Quit.

If the test reveals a problem, you may be able to correct it by using Disk First Aid or another disk repair program (see the instructions in the next section) or you may need to reinitialize the disk (see "Initializing a Hard Disk," later in this chapter). Consult an Apple-authorized service provider for assistance if necessary. If you had a hard disk from another manufacturer installed after you bought your computer, use the software that came with the disk or contact the disk manufacturer to get the latest version of software.

Repairing a damaged hard disk or floppy disk

You can repair some types of disk damage by using the Disk First Aid program, which is on the system software CD-ROM disc that came with your computer.

1 Start up your computer from the system software CD-ROM disc that came with your computer.

See "Starting Up From the System Software CD-ROM Disc" later in this chapter.

2 Locate the Disk First Aid icon and double-click it to open the Disk First Aid program.

Disk First Aid is usually in the Utilities folder on the system software CD-ROM disc.

Disk First Aid

3 Click the icon of the disk you want to test.

Disk icons appear in a box at the top of the Disk First Aid window.

4 Click Repair to begin testing and repairing the disk.

You can't repair the startup disk or the disk that contains the Disk First Aid program, but you can test these disks by clicking Verify. If the program reveals a problem with either of these disks, start up the computer from another disk so that you can repair the damaged disk.

If you want to test and repair another disk, click its icon and then click Repair.

5 When testing and repair are done, choose Quit from the File menu.

If Disk First Aid cannot correct the problem

- Try repairing the disk again. Sometimes repeating the process corrects the problem.
- Use another disk repair or recovery program. Some disk repair programs let you recover information from a damaged disk.
- Consult an Apple-authorized service provider for help.
- If you can't repair the disk, you'll need to reinitialize it, which erases all the information on it. Before you reinitialize, be sure you recover all the information you can and back it up. Then erase (reinitialize) the disk. For instructions on reinitializing a floppy disk, see Mac OS Guide, available in the Guide (?) menu. For instructions on reinitializing a hard disk, see "Initializing a Hard Disk," next.

  If reinitialization doesn't work, discard the damaged disk (if it's a floppy disk) or take it to your Apple-authorized service provider for repair (if it's a hard disk). Bring your system software CD-ROM disc with you to the service provider.

Initializing a hard disk

The hard disk inside your computer was initialized (formatted for use) at the factory, so you shouldn't need to initialize it. You need to initialize a hard disk only if one of the following is true:

- You purchase an uninitialized hard disk from another manufacturer.
- Your hard disk is damaged and can't be repaired with Disk First Aid.

If a hard disk needs to be initialized, its icon does not appear on the desktop when you start up the computer using another disk.

You initialize your internal hard disk using a program called Drive Setup, which is on the system software CD-ROM disc that came with your computer.

▲ **Warning** Initializing a disk erases any information that may be on it. Before you initialize a damaged disk, try to repair it as described in "Repairing a Damaged Hard Disk or Floppy Disk" earlier in this section. ▲

1 Start up your computer from the system software CD-ROM disc that came with your computer.

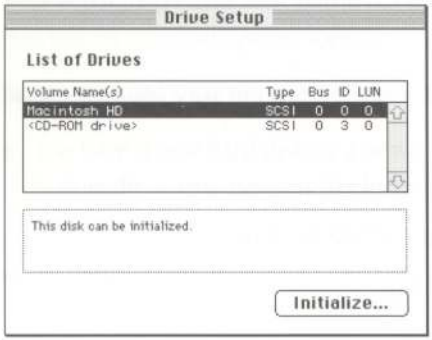
See "Starting Up From the System Software CD-ROM Disc" later in this chapter.

2 Locate the Drive Setup icon and double-click it to open the Drive Setup program.

Drive Setup is usually in the Utilities folder on the system software CD-ROM disc.

Drive Setup

3 In the list of drives, click the disk you want to initialize.



4 Click Initialize to initialize the hard disk.

5 Click Quit when you see a message reporting that initialization was successful.

If a message reports that initialization failed, try again. If initialization fails a second time, take the disk to your Apple-authorized service provider for repair.

Starting up from the system software CD-ROM disc

To test, repair, or initialize a hard disk, or to install or remove system software on a hard disk, you need to start up your computer from another disk, such as the system software CD-ROM disc.

The procedure for starting up from the CD-ROM disc varies depending on the condition of the system software on your hard disk. To find out which procedure to use, you must turn on your Macintosh.

The steps that follow tell how to start up from a CD-ROM disc, depending on what you see on your screen.

If you see a blinking question mark on your screen

The blinking question mark means that your Macintosh is unable to find usable system software on your hard disk.

1. Press the Stop/Eject button of your CD-ROM drive to open the CD-ROM door.
2. Place the CD-ROM disc in the drive with the disc label facing out.
3. Close the door.

   Your Macintosh recognizes the CD-ROM disc as a startup disk, and in a few seconds the Macintosh desktop appears.

If you see the Macintosh desktop

1. Press the Stop/Eject button of your CD-ROM drive to open the CD-ROM door.
2. Place the CD-ROM disc in the drive with the disc label facing out.
3. Close the door.
4. Hold down the C key on your keyboard while you choose Restart from the Special menu.

   Continue to hold down the C key until you see the "Welcome to Macintosh" message.

Installing system software

Your Macintosh came with all the necessary system software installed on its internal hard disk, so you don't need to install system software on that disk unless you encounter software problems.

When should you install system software?

- You have a new hard disk or a newly initialized hard disk that does not yet contain system software. Follow the instructions in "Performing a Normal ('Easy') Installation of System Software" later in this section.
- You want to upgrade to a more recent version of system software. Follow the instructions that came with your system software upgrade.

What kind of installation should you do?

There are three kinds of system software installation.

- A normal ("easy") installation automatically installs all the Mac OS system software appropriate for your model of Macintosh.
- A "clean" installation installs all the Mac OS system software appropriate for your model of Macintosh, just as in a normal installation, but it also includes a procedure for checking all the files in your System Folder for possible problems or conflicts.
- A custom installation lets you select a specific combination of system software files or install or update one or more specific files.

Important If you're having a problem with your system software, you may not need to reinstall system software. If you see an icon with a question mark in the middle of the screen when you try to start up your computer, follow the instructions in "Testing Your Hard Disk" earlier in this chapter to test your startup hard disk and repair any damage. If repairing the disk doesn't help, follow the instructions in "Performing a Normal ('Easy') Installation of System Software," next, to reinstall system software on the hard disk.

Performing a normal ("easy") installation of system software

Follow the steps in this section to do what is commonly called a normal ("easy") installation of system software.

If you're installing system software on a hard disk for the first time, make sure that your hard disk has been initialized, a process that prepares the disk to store information. If you see the hard disk's icon on the desktop when you start up the computer, the disk has been initialized. If no disk icon appears when you start up, see "Initializing a Hard Disk," earlier in this chapter, for instructions.

Note: It is not necessary to erase your hard disk before installing system software. If you do, however, you may need to reinstall certain items that were on your hard disk before you erased it, as described in step 14 of this procedure.

To perform a normal installation, follow these steps:

1 Start up your computer from the CD-ROM disc that contains system software.

Do this by inserting the CD-ROM disc into the CD-ROM drive and holding down the C key while you restart the computer. For detailed steps, see "Starting Up From the System Software CD-ROM Disc," earlier in this chapter.

2 Open the Install Mac OS program by double-clicking its icon.

Install Mac™ OS

You see the Installer's initial screen; then a screen appears describing the four steps in the installation process.

3 Click the first button to read about the installation process, as well as compatibility and troubleshooting information.

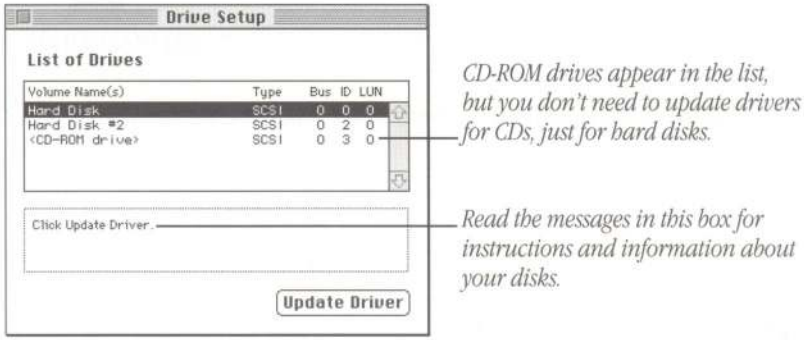
Read the onscreen document that appears. When you're finished reading the document, choose Quit from the File menu to return to the Install Mac OS screen.

4 Click the second button in the main Install Mac OS screen to update your disk drivers.

Hard disks with old drivers might cause problems after installing Mac OS 7.6. Your computer might not start up, or you might not see the hard disk icons on the desktop. To avoid these problems, it's a good idea to update your drivers.

After you click the second button, you first see a dialog box asking you to confirm that you can use the provided utilities. Click Continue.

5 Select the name of a hard disk attached to your computer.



6 Read the messages in this box for instructions and information about your disks. Click Update Driver.

Repeat steps 5 and 6 to update the drivers on any additional hard disks you have.

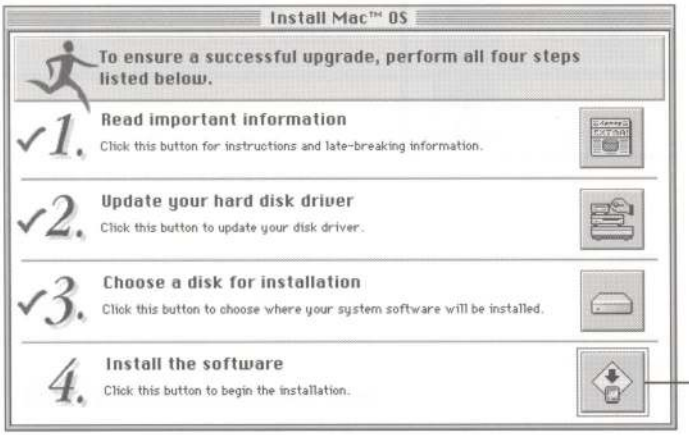
7 When you've finished updating the drivers on all your hard disks, close the window to quit the Drive Setup program.

8 Click the third button to select the disk on which you want to install Mac OS 7.6.

9 In the dialog box that appears, choose the disk on which you're going to install Mac OS 7.6. Then click Select.

Choose the destination disk from this pop-up menu.

10 Click the fourth button to install Mac OS 7.6 and additional software.



Click here.

11 In the dialog box that appears, select the software you want to install.

Note: Your screen may look slightly different from the picture below.

Click to put an X in the box for each software product you want to install. Recommended choices are preselected.

You use the Options button to perform a clean installation. For information, see "Performing a Clean Installation of System Software," later in this chapter.

For more information about custom installations, see the next section.

The basic system includes system software, OpenDoc, and OpenDoc Essentials. You can also choose to install the software listed below. Recommended choices are preselected.

- QuickDraw 3D, to view and manipulate 3D images on your computer
- MacLinkPlus translators, to easily open documents created in applications you don't have, using appropriate applications you do have (including DOS and Windows documents). (These translators work with the Mac OS Easy Open control panel.)
- Apple Remote Access, to connect to a remote computer (such as your computer at work) using a modem
- Cyberdog, an application to access the Internet
- Open Transport PPP software, to connect to the Internet using a modem
- English text-to-speech software, to have your computer read text aloud
- QuickDraw GX, for enhanced printing and typographical capabilities

Installing a customized system: The Install Mac OS program installs the software recommended for your model of computer. You can use the Customize option to be more specific about which software to install. For instructions, see "Performing a Custom Installation," later in this chapter.

12 Click Start to install the software you selected.

The Install Mac OS program checks your destination disk for any problems and repairs them, if necessary.

After your disk is tested, the software you selected is installed.

13 When the installation is complete, restart your computer.

If your computer does not start up properly, see "If the Installation Was Not Successful," next.

14 If necessary, install or reinstall other software that may be missing from your startup disk.

If you erased your hard disk prior to installing system software, certain system extensions or application programs that were originally on your hard disk may need to be reinstalled. Some additional extensions and programs are on the CD-ROM disc that contains system software. System extensions or application programs from other vendors can be reinstalled from their installation disks.

If the installation was not successful

If a message reports that installation was not successful, try installing again. (Follow the instructions on the screen.)

If, after reinstalling system software by doing a normal installation, you still experience problems with your computer, follow the steps in the section for performing a "clean" installation of system software, later in this chapter.

Performing a custom installation

For most Macintosh users, the Easy Install procedure described earlier is appropriate because it automatically installs all the items you need. However, if you'd like to select a combination of system software files for your specific needs, you can customize your system software installation. You use custom installation to install or update one or more specific files, or to save space on your hard disk by installing only the files you want.

You can also use the Customize option to add additional software or to install a System Folder that can be used on any computer model.

- You can be more specific about what software packages you install. You can also specify which components to install from the packages you choose.
- After installing a product, you can add extra components. For example, you can install additional printer drivers.
- You can create a "universal" system that works on all computers that can use Mac OS 7.6.

To install customized system software, follow these steps:

1 Follow the steps in the previous section through step 9 (choosing a disk for the installation).

2 Click the fourth button on the main Install Mac OS screen.

The following dialog box appears.

3 Click Customize.

The following screen appears.

Note: Your screen may look slightly different from the picture below.

Click to put an X in the box for each software product you want to install. Recommended choices are preselected.

You use the Options button to perform a clean installation. For information, see "Performing a Clean Installation of System Software," later in this chapter.

To use the easy installation process, click this button.

4 Select the software you want to install.

In addition to the optional software described in the preceding section, you can be more specific about which portions of the default system to install. You can choose from the following additional options:

- Mac OS 7.6, the basic system software
- OpenDoc, to take advantage of a new kind of software technology. Only computers with PowerPC microprocessors can use OpenDoc.
- OpenDoc Essentials, a set of software "parts" to get you started using OpenDoc technology. To use OpenDoc Essentials, you also need to install OpenDoc.

Note: Cyberdog software also requires OpenDoc. To install Cyberdog, you need to install OpenDoc.

As you proceed in the custom installation process, you'll be able to determine exactly which components will be installed for the software you select.

The Install Mac OS program will automatically check your destination disk for any problems and repair it, if necessary. If you don't want your disk to be checked, click the Options button. In the dialog box that appears, click the Check Destination Disk checkbox to remove the X.

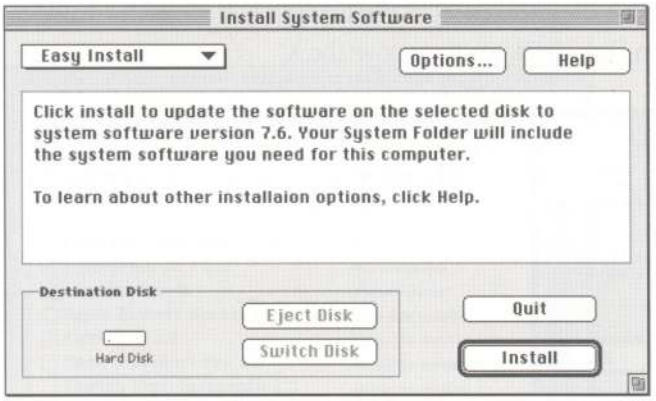
To skip checking your disk, click this box to remove the X.

5 Click Start.

The Mac OS program opens the Installer for the first software product you selected. You'll use the Installer to specify which components you want to install.

6 When you see the Installer's welcome screen, click Continue.

The Easy Install dialog box appears.

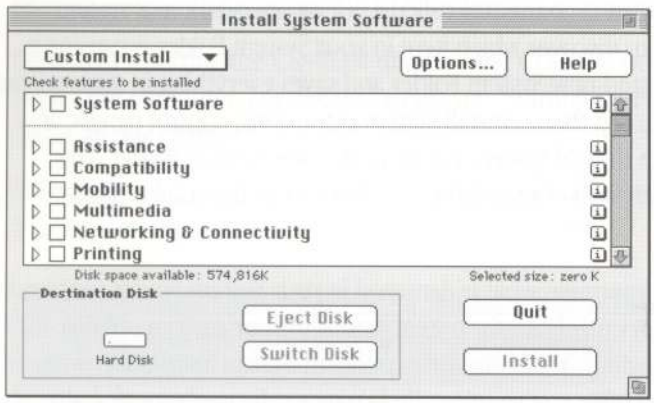


If you want all the recommended components for this product, click Install.

If you choose the Easy Install option, you can skip ahead to step 10. If you want to be more specific about which components to install, follow steps 7 through 10, below.

7 Open the pop-up menu and choose Custom Install.

The Custom Install dialog box appears, listing all available components for the first software product.



8 Scroll through the list of components and click the checkbox next to each component you want to install.

You can see and select individual items within each component by clicking the arrow to the left of the component, then clicking the item you want to install. To get additional information about each component listed, click the box with the letter *i* in it to the right of the component. Files that support the components you choose may also be installed.

9 Click Install.

10 Follow the instructions that appear on the screen.

11 Repeat steps 6 through 10 for all the software you selected.

The Install Mac OS application automatically opens the Installer for the next selected software package on the list.

12 After all the installations are completed, restart your computer to use your new software.

The system software is installed and your computer is ready to use. Don't forget to eject the CD-ROM disc containing system software when you are finished.

Performing a clean installation of system software

This section describes how to perform what is commonly called a "clean" installation of system software. A clean installation allows you to discover which item in your System Folder is causing a problem. A clean installation creates a brand new System Folder and saves everything in your original System Folder in a different location. You can then reinstall system extensions, control panels, and other special software one at a time from the old System Folder to the new System Folder. This procedure allows you to determine which item in the old System Folder was the source of the problem.

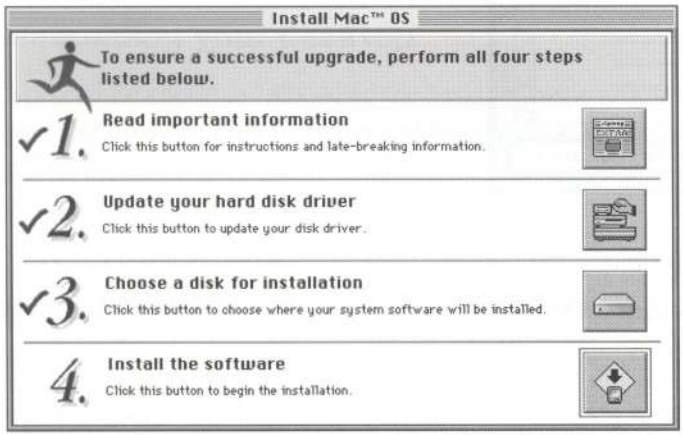
Perform a clean installation if you can't determine what is damaged in your System Folder (especially if you think any special software, such as control panels, system extensions, or custom utilities, may be causing the problems you're experiencing). You should also perform a clean installation if you're still having problems with your computer after you've reinstalled system software by performing a normal installation.

To perform a clean installation, follow these steps:

1 Start up your computer from the CD-ROM disc that contains system software.

Do this by inserting the CD-ROM disc into the CD-ROM drive and holding down the C key while you restart the computer. For detailed steps, see "Starting Up From the System Software CD-ROM Disc" earlier in this chapter.

2 Follow steps 1 through 9 (choose a disk for the installation) under "Performing a Normal ('Easy') Installation of System Software," earlier in this chapter.



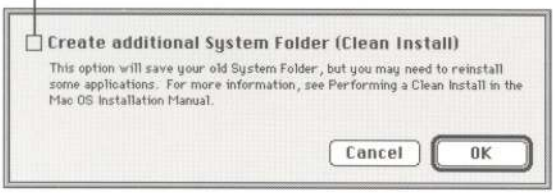
3 Click the fourth button on the main Install Mac OS screen.

The following screen appears.

4 Click Options.

5 In the screen that appears, click the checkbox next to "Create additional System Folder," then click OK.

Click to put an X in this box, then click OK.



6 Click Start.

A new System Folder is installed on your hard disk. (The old System Folder is renamed Previous System Folder.)

Reinstall extensions, control panels, and other startup items not installed with Mac OS 7.6 from their original disks, if possible. If you don't have the original disks, you can drag these items one at a time from the Previous System Folder to the new System Folder. Restart your computer after you reinstall each item, to make sure your software is compatible with Mac OS 7.6.

Rebuilding your desktop

A procedure known as "rebuilding the desktop" helps your Macintosh to keep accurate track of data on your startup disks. Even though rebuilding the desktop does not usually fix problems once they occur, it does prevent some types of problems. Therefore, it's a good idea to rebuild your desktop once a month or so.

Before you rebuild the desktop, you'll need to turn off some extensions, which may interfere with the desktop-rebuilding process. You'll turn them back on later.

To rebuild the desktop, follow these steps:

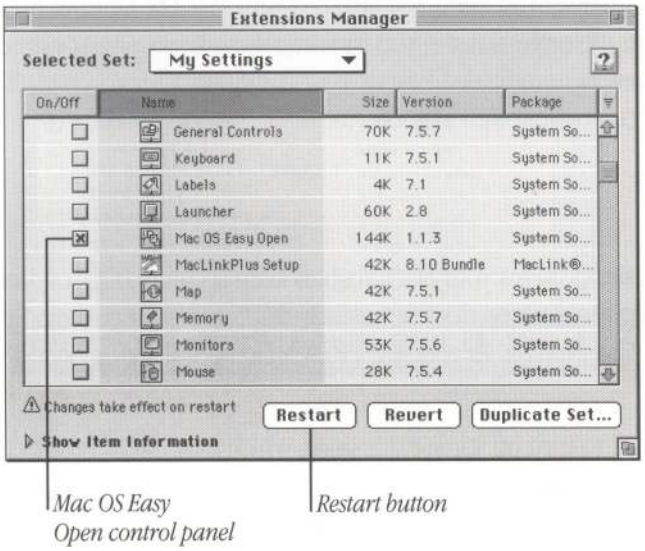
1 Open the Apple (🍎) menu and choose Control Panels. Then double-click the Extensions Manager control panel to open it.

2 Open the Edit menu and choose All Off.

This turns off all extensions. You'll notice that none of the items in the Extensions Manager's list is checked.

3 Turn on Mac OS Easy Open by clicking it in the list so that a checkmark appears beside it.

You can find Mac OS Easy Open by scrolling down the list of extensions. Mac OS Easy Open appears under the heading "Control Panels."



4 Click the Extensions Manager's Restart button while holding down the Command (⌘) and Option keys.

Hold down the ⌘ and Option keys until you see the dialog box that asks if you're sure you want to rebuild your desktop file. When the dialog box appears, you can release the keys.

5 Click OK.

If a message appears asking if you are sure you want to rebuild the desktop, click OK.

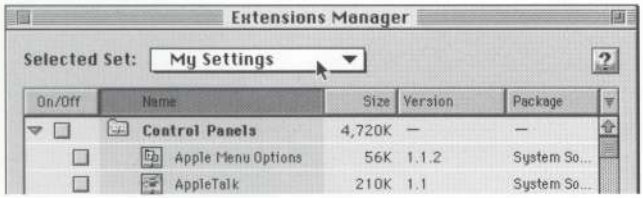
The computer rebuilds the desktop. This can take several minutes.

Important Do not stop the desktop-rebuilding process. Doing so could damage your system files.

6 Open the Apple (🍎) menu and choose Control Panels. Then double-click the Extensions Manager control panel to open it.

7 From the Selected Set pop-up menu, choose "My Settings."

This turns your original set of extensions back on.



8 Restart your computer to activate your set of extensions.

Part Six

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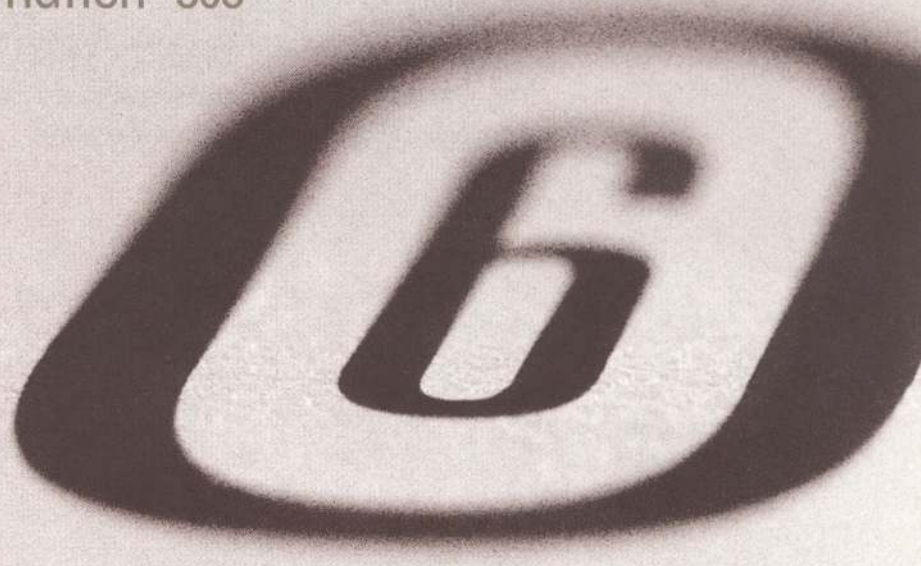


Appendix A

Health, Safety, and Maintenance Tips

For your own safety and that of your equipment, follow all the instructions in this appendix. Keep these instructions available for reference by you and others.

Health-related information about computer use

Muscle soreness, eye fatigue, and other discomforts and injuries sometimes associated with using computers can occur from performing any number of activities. In fact, misuse of the same muscles during multiple activities can create a problem that might not otherwise exist. For example, if you engage in nonwork activities that involve repetitive stress on the wrist—such as bicycling—and also use your computer's keyboard improperly, you may increase your likelihood of developing wrist problems. Some individuals are at greater risk of developing these problems because of their health, physiology, lifestyle, and general exposure to stress. Work organization and conditions, such as workstation setup and lighting, also play a part in your overall health and comfort. Preventing health problems is a multifaceted task that requires careful attention to the way you use your body every hour of every day.

The most common health effects associated with using a computer are musculoskeletal discomfort and eye fatigue. We'll discuss each area of concern.

Musculoskeletal discomfort

As with any activity that involves sitting for long periods of time, using a computer can make your muscles sore and stiff. To minimize these effects, set up your work environment carefully, using the guidelines that follow, and take frequent breaks to rest tired muscles. To make working with your computer more comfortable, allow enough space in your work area so that you can change position frequently and maintain a relaxed posture.

Another type of musculoskeletal concern is repetitive stress injuries (RSIs), also known as cumulative trauma disorders (CTDs). These problems can occur when a certain muscle or tendon is repeatedly overused and forced into an unnatural position. The exact causes of RSIs are not totally understood, but in addition to awkward posture, such factors as the amount of repetition, the force used in the activity, the individual's physiology, workplace stress level, and lifestyle may affect the likelihood of experiencing an RSI.

RSIs did not suddenly arise when computers were invented; tennis elbow and writer's cramp, for example, are two RSIs that have been with us for a long time. Although less common than other RSIs, one serious RSI discussed more often today is a wrist problem called carpal tunnel syndrome, which may be aggravated by improper use of computer keyboards. This nerve disorder results from excessive pressure on the median nerve as it passes through the wrist to the hand.

This section offers advice on setting up your work area to enhance your comfort while you use your computer. Since the effects of repetitive movements associated with using a computer can be compounded by those of other work and leisure activities to produce or aggravate physical problems, proper use of your computer system must be considered as just one element of a healthy lifestyle.

No one, of course, can guarantee that you won't have problems even when you follow the most expert advice on using computer equipment. You should always check with a qualified health specialist if muscle, joint, or eye problems occur.

Eye fatigue

Eye fatigue can occur whenever the eyes are focused on a nearby object for a long time. This problem occurs because the eye muscles must work harder to view an object that's closer than about 20 feet (about 6 meters). Improper lighting can hasten the development of eye fatigue. Although eye fatigue is annoying, there's no evidence that it leads to permanent damage.

Whenever you're engaged in an activity that involves close-up work—such as reading a magazine, doing craft work, or using a computer—be sure to have sufficient glare-free lighting and give your eyes frequent rest breaks by looking up and focusing on distant objects. Remember to have your eyes examined regularly.

To prevent discomfort and eye fatigue:

- Arrange your work space so that the furniture is properly adjusted for you and doesn't contribute to an awkward working posture.
- Take frequent short breaks to give your muscles and eyes a chance to rest.

Arranging your office

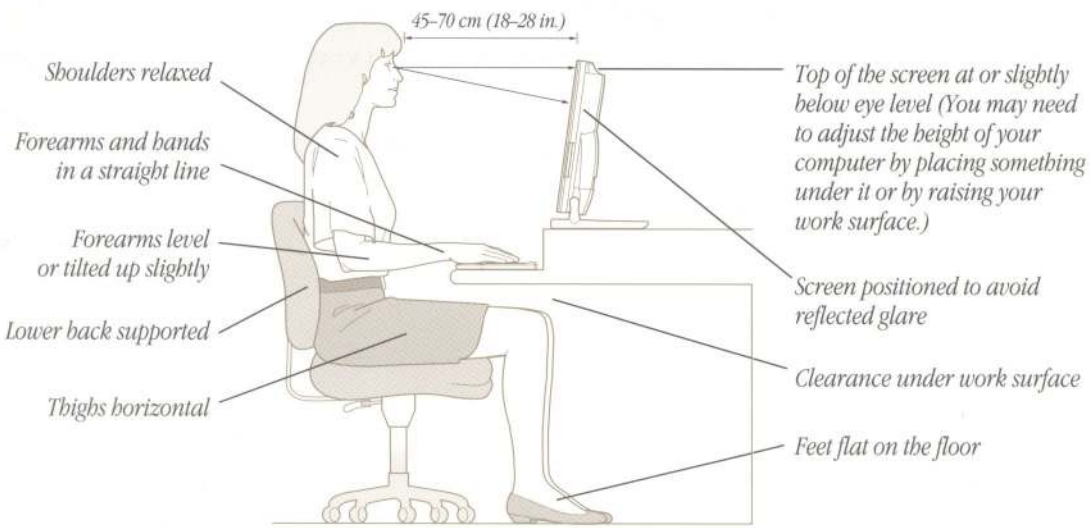
Here are some guidelines for adjusting the furniture in your office to accommodate your physical size and shape.

- An adjustable chair that provides firm, comfortable support is best. Adjust the height of the chair so your thighs are horizontal and your feet flat on the floor.

  The back of the chair should support your lower back (lumbar region). Follow the manufacturer's instructions for adjusting the backrest to fit your body properly.
- When you use the computer keyboard, your shoulders should be relaxed. Your upper arm and forearm should form an approximate right angle, with your wrist and hand in roughly a straight line.

  You may have to raise your chair so your forearms and hands are at the proper angle to the keyboard. If this makes it impossible to rest your feet flat on the floor, you can use a footrest with adjustable height and tilt to make up for any gap between the floor and your feet. Or you may lower the desktop to eliminate the need for a footrest. Another option is to use a desk with a keyboard tray that's lower than the regular work surface.

- If you have a mouse in addition to the trackpad, or if you have removed the trackpad from the keyboard, position the mouse or trackpad at the same height as your keyboard. Allow adequate space to use the mouse comfortably.
- Adjust the computer so the top of the screen is slightly below your eye level when you're sitting at the keyboard. (You may need to place something under it or raise your work surface.) The best distance from your eyes to the screen is up to you, although most people seem to prefer 18 to 28 inches (45 to 70 cm).
- Position the screen to minimize glare and reflections on the screen from overhead lights and windows. The computer's stand lets you set the screen at the best angle for viewing, helping to reduce or eliminate glare from lighting sources you can't move.



Avoiding fatigue

- Change your seated position, stand up, or stretch whenever you start to feel tired. Frequent short breaks are helpful in reducing fatigue.
- Use a light touch when typing and using the trackpad or a mouse and keep your hands and fingers relaxed.
- Some computer users may develop discomfort in their hands, wrists, or arms after intensive work without breaks. If you begin to develop chronic pain or discomfort in your hands, wrists, or arms, consult a qualified health specialist.
- Allow adequate work space so that you can use your keyboard and other devices comfortably. Place papers or other items so you can view them easily while using your computer. A document stand may make reading papers more comfortable.
- Eye muscles must work harder to focus on nearby objects. Occasionally focus your eyes on a distant object, and blink often while you work.
- Clean your screen regularly. Keeping the screen clean helps reduce unwanted reflections.

What about electromagnetic emissions?

There has been recent public discussion of the possible health effects of prolonged exposure to extremely low frequency (ELF) and very low frequency (VLF) electromagnetic fields. Such fields are associated with electromagnetic sources such as television sets, electrical wiring, and some household appliances—as well as computer monitors.

Apple has reviewed scientific reports and sought the counsel of government regulatory agencies and respected health organizations. Based on the prevailing evidence and opinions, Apple believes that the electric and magnetic fields produced by computer monitors do not pose a health risk.

In response to those customers who wish to reduce their exposure to electromagnetic fields, Apple has lowered the emission levels of our products. We are also actively encouraging further scientific research so we can continue to promote the health and safety of our customers and employees.

Safety instructions

For your own safety and that of your equipment, always take the following precautions.

Turn off the computer completely and disconnect the power plug (by pulling the plug, not the cord) if any of the following conditions exists:

- the power cord or plug becomes frayed or otherwise damaged
- you spill something into the case
- your computer is exposed to rain or any other excess moisture
- your computer has been dropped or the case has been otherwise damaged
- you suspect that your computer needs service or repair
- you want to clean the case (use only the recommended procedure described later in this chapter)

Be sure that you always do the following:

- Read all the installation instructions carefully before you plug your computer into a wall socket.
- Keep these instructions handy for reference by you and others.
- Follow all instructions and warnings dealing with your system.
- Keep your computer away from sources of liquids, such as washbasins, bathtubs, shower stalls, and so on.
- Protect your computer from dampness or wet weather, such as rain, snow, and so on.

▲ **Warning** Electrical equipment may be hazardous if misused. Operation of this product, or similar products, must always be supervised by an adult. Do not allow children access to the interior of any electrical product and do not permit them to handle any cables. ▲

Handling your computer equipment

Follow these guidelines for handling your computer and its components:

- When setting up your computer, place components on a sturdy, flat surface, and carefully follow all setup instructions.
- When connecting or disconnecting a cable, always hold the cable by its connector (the plug, not the cord).
- Turn off your computer and all its components before connecting or disconnecting any cables to add or remove any component. Failure to do so could seriously damage your equipment.
- Never force a connector into a port. If the connector and port do not join with reasonable ease, they probably don't match. Make sure that the connector matches the port and that you have positioned the connector correctly in relation to the port.
- Take care not to spill any food or liquid on the computer, the keyboard, or other components. If you do, turn your computer off immediately and unplug it before cleaning up the spill. Depending on what you spilled and how much of it got into your equipment, you may need to have your equipment serviced by an Apple-authorized service provider.
- Protect the computer and its components from direct sunlight and rain or other moisture.
- Keep all ventilation openings clear and unobstructed. Without proper air circulation, components can overheat, causing damage or unreliable operation.
- If there is interference on the screen or on a television or radio near your computer, move the affected equipment farther away.

▲ **Warning** This equipment is intended to be electrically grounded. Your Macintosh is equipped with a three-wire grounding plug—a plug that has a third (grounding) pin. This plug will fit only a grounded AC outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet. Do not defeat the purpose of the grounding plug! ▲

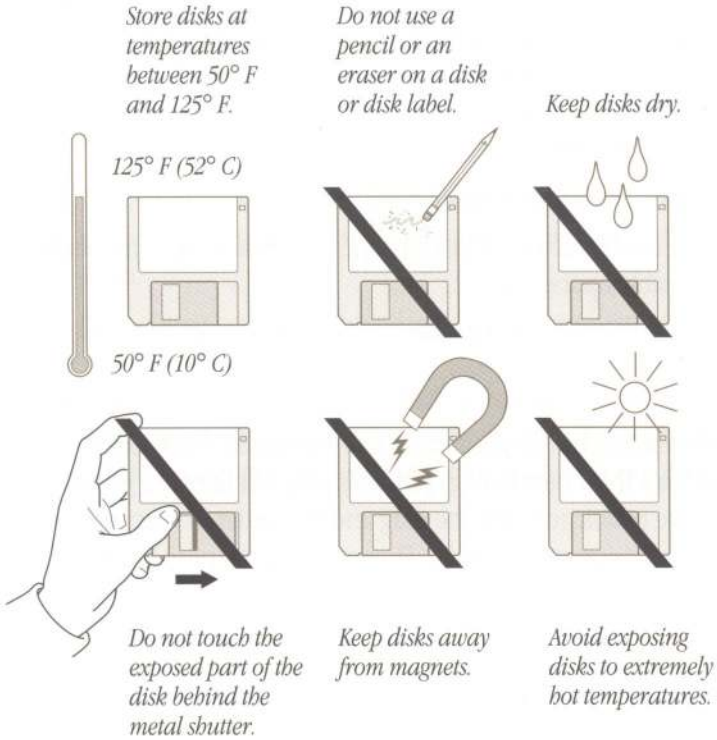
Handling the keyboard

Take care not to spill any liquid on the keyboard. If you do, turn off your computer immediately.

- If you spill liquid that is thin and clear, unplug the keyboard, turn it upside down to let the liquid drain out, and let it dry for 24 hours at room temperature. If, after you take these steps, the keyboard doesn't work, take it to an Apple-authorized service provider for repair.
- If you spill liquid that is greasy, sweet, or sticky, unplug the keyboard and take it to an Apple-authorized service provider for repair.

Handling floppy disks

Follow the procedures below for handling floppy disks. Do not put floppy disks near the bass unit.



Handling CD-ROM discs

Keep these important safety instructions in mind as you use CD-ROM discs:

- Hold a disc by the edges or by one edge and the center hole. Do not touch the disc surface.
- To clean discs, wipe the shiny surface with a soft damp cloth, working in straight lines from center to edge. Do not use any form of cleaning agent.
- To avoid damage to your discs, keep these points in mind:

Do not expose discs to direct sunlight.

Do not write on discs.

Do not spill liquids on discs.

Do not put tape on discs.

Do not scratch discs.

Do not get dust on discs.

Other important safety instructions to keep in mind as you use your CD-ROM drive.

- Position your computer so that when the door opens, it doesn't bump into anything.
- Do not leave the door open. If dust gets on the lens of the CD-ROM drive, the drive may have problems reading your compact discs.
- Do not force the door open by hand.
- Do not wipe the lens with a paper towel or other abrasive surface. If you need to clean the lens, see an Apple-authorized service provider for a lens cleaner.
- Never transport your computer with a disc inside the CD-ROM drive.
- Keep your computer equipment away from any source of liquid (such as washbasins, bathtubs, and shower stalls). If you drink coffee or other beverages while you're at your computer, take care not to spill.
- Avoid exposing your equipment to damp or wet weather. If your system is near a window, be sure the window is closed in rainy weather.

You should remove any CD-ROM disc in the CD-ROM drive before shutting down the computer. To eject a CD-ROM disc, select the CD-ROM disc icon and choose Put Away from the File menu. (You can also drag the CD-ROM disc's icon to the Trash.)

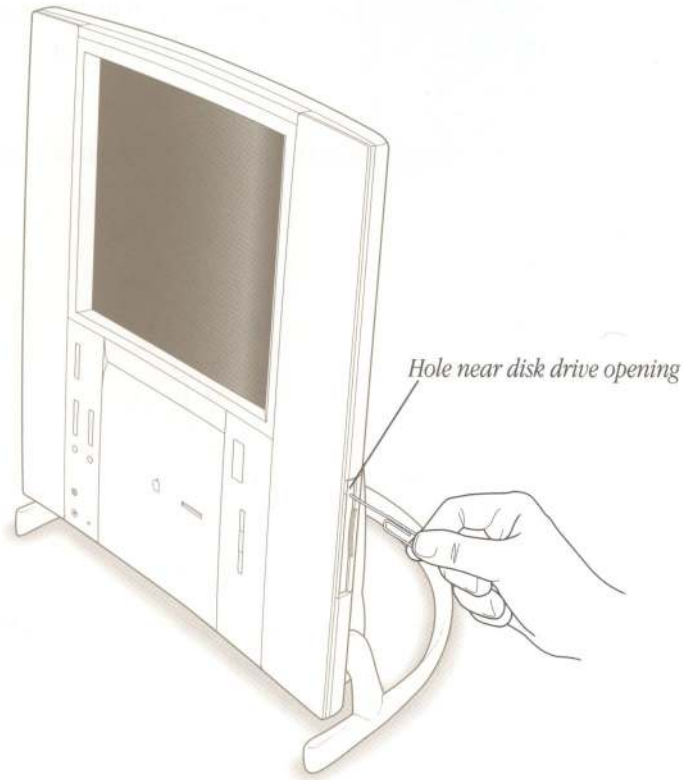
Ejecting a floppy disk

To eject a floppy disk, select the disk icon and choose Put Away from the File menu. (You can also drag the disk's icon to the Trash.)

If you can't eject a floppy disk

If you can't eject a floppy disk in the usual way, try the following in order:

- Hold down the ⌘ and Shift keys and press the number 1 key at the upper left of your keyboard to eject a disk in the internal disk drive.
- Turn off the computer. If the disk isn't ejected, hold down the button on your trackpad or other pointing device while you turn the computer on again.
- Locate the small hole near the disk drive's opening, and carefully insert the end of a large straightened paper clip into it. Push gently until the disk is ejected. Do not use excessive force.



If nothing works, take the computer to your Apple-authorized service provider to have the disk removed.

Ejecting a CD-ROM disc

To eject a CD-ROM disc, select the disc icon and choose Put Away from the File menu. You can also drag the disc's icon to the Trash. (*Note:* You won't lose information on the CD-ROM disc by dragging its icon to the Trash. *Don't* select the disc icon and then choose Eject Disk from the Special menu.)

If you can't eject a CD-ROM disc

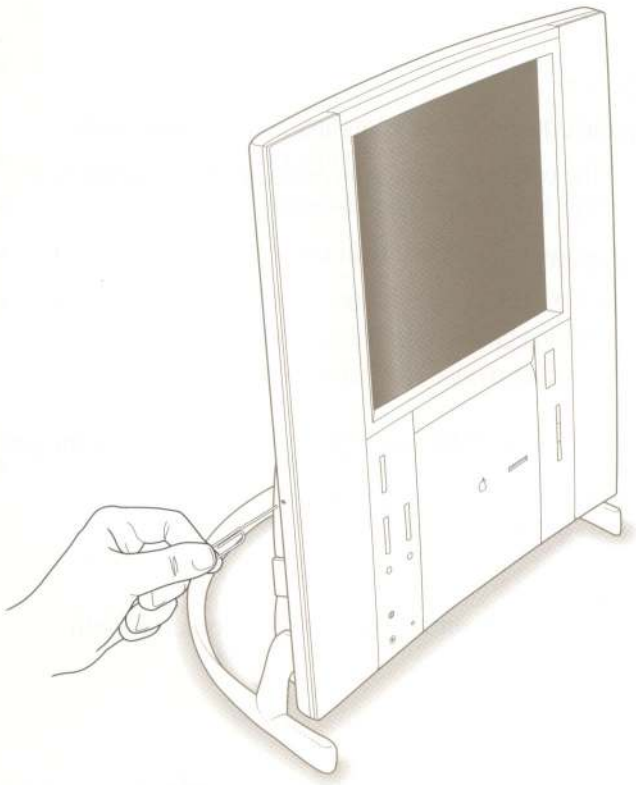
If a CD-ROM disc icon appears on your screen:

- If the AppleCD Audio Player is active, choose Eject CD from the File menu or click the Eject button in the AppleCD Audio Player controller.
- If you see a message that a disc can't be put away because it is being shared, turn off file sharing in the Sharing Setup control panel in the Apple (🍎) menu, then try again to put away the disc.

If no CD-ROM disc icon appears on your screen:

- Restart your computer. Immediately after the startup sound, press the Stop/Eject button of your CD-ROM drive to open the door.

- If the door doesn't open, do the following: Locate the small pinhole on the left side of the computer, insert the end of a large straightened paper clip firmly and horizontally into the pinhole, and push gently until the door is released. Do not force the door open; wait until the paper clip has released it to be sure you don't break the door.



If neither of these suggestions works, your CD-ROM drive may be damaged. Consult the service and support information that came with your computer for information on contacting an Apple-authorized service provider or Apple for further assistance.

Power supply

The power supply in your computer is a high-voltage component and should not be opened for any reason, even when the computer is off. If the power supply needs service, contact your Apple-authorized dealer or service provider.

Cleaning your equipment

Follow these general rules when cleaning the outside of your computer and its components:

- Use a damp, soft, lint-free cloth to clean the computer's exterior. Avoid getting moisture in any openings.
- Don't use aerosol sprays, solvents, or abrasives.

Cleaning the computer case

To clean the case, do the following:

1. Turn off the computer completely and then disconnect the power plug. (Pull the plug, not the cord.)
2. Wipe the surfaces lightly with a clean, soft cloth dampened with water.

Cleaning the bass unit

If the outside of the bass unit becomes dusty, wipe the surface lightly with a clean, soft cloth dampened with water.

Cleaning the monitor

To clean the screen, put household glass cleaner on a soft cloth and wipe the screen. Don't spray the cleaner directly on the screen, because the liquid might drip into the monitor or computer.

Cleaning the trackpad

Sometimes humidity or condensation may cause moisture to gather on the trackpad. If this happens, gently wipe the trackpad with a clean cloth before you use it.

Cleaning and caring for the leather palmrests

To keep the leather palmrests in top condition, do the following several times a year:

- Moisten a soft cloth in a mild soap solution and carefully apply this damp (not wet) cloth to the leather with light, circular movements until the leather is clean. Repeat using clean water. Let the leather dry completely. Do not use external sources of heat such as a hair dryer.
- After cleaning, apply a leather conditioner (available where genuine leather products are sold). Use a soft cloth and light, circular movements. Let the leather dry; then buff gently with a soft, dry cloth.

To prevent damage to the leather:

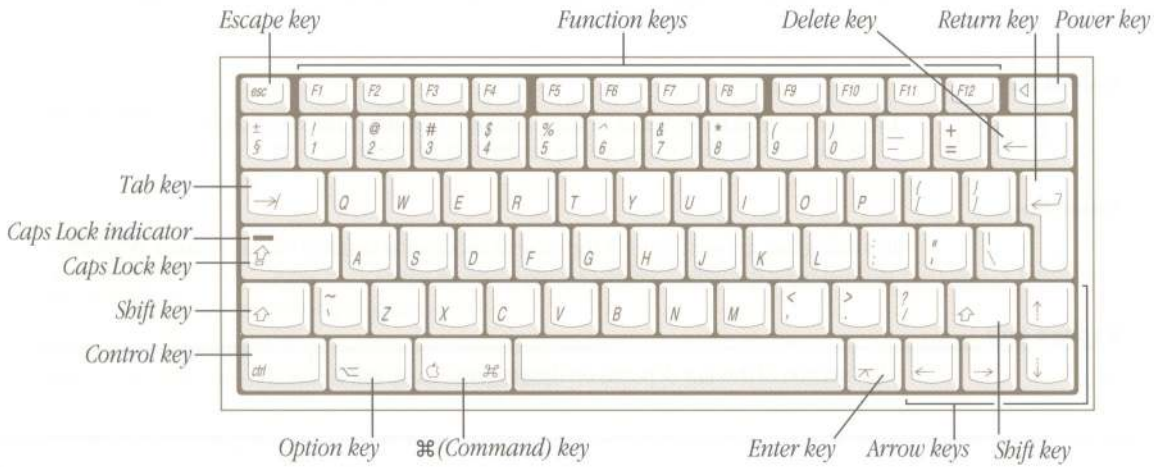
- Do not use hot water, abrasive polishes, solvents, sprays, or soaps that contain abrasives.
- Do not use stiff brushes or a hard brushing action.
- Wipe wet patches caused by soft drinks, coffee, or tea immediately using absorbent material. If a stain is left, apply a leather stain remover and conditioner (work from the outside towards the center to avoid leaving a ring). *Note:* Stain treatment may change the original appearance of the leather.
- Avoid lengthy exposure to sun, which will dry, crack, and fade the leather.

Special Keys on Your Keyboard

Your computer keyboard contains certain special keys that typewriter keyboards don't have. Many of these keys allow you to give commands to the computer without using the trackpad. For example, in many application programs, pressing the ⌘ (Command) key at the same time as the Q key lets you quit the program.

Your keyboard looks like one of the illustrations on the next page. The illustrations, and the table that follows, explain the function of all the special keys.

Escape key
Function keys
Delete key
Power key
Tab key
Caps Lock indicator
Caps Lock key
Shift key
Control key
Option key
⌘ (Command) key
Enter key
Arrow keys
Return key
Shift key


Escape key
Function keys
Delete key
Return key
Power key
Tab key
Caps Lock indicator
Caps Lock key
Shift key
Control key
Option key
⌘ (Command) key
Enter key
Arrow keys
Shift key

Special keys on your keyboard

Arrow keys

Use to move the insertion point, as an alternative to using the pointer. In some programs, the arrow keys have other functions.

Caps Lock key

Use to capitalize a series of letters (numbers and symbols aren't affected).

⌘ (Command) key

Use in combination with other keys as an alternative to choosing a menu command.

Control key

Use in combination with other keys to produce special characters or modify actions.

Delete key

Use to delete selected material, or the character to the left of the insertion point.

Enter key

In a dialog box, pressing Enter is the same as clicking the outlined button. In some programs, pressing this key confirms information you have provided.

Escape key

The function of this key depends on the program you're using.

Special keys on your keyboard

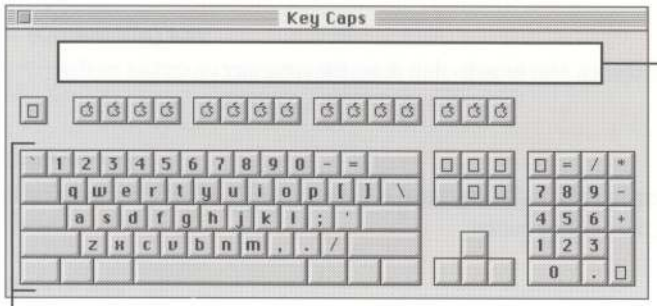
Function keys	
	Some programs allow you to use the 12 function keys to give commands. You can assign commands or action sequences to function keys with special utility programs.
Option key	
	Use in combination with other keys to produce special characters or modify actions.
Power key	
	Press to turn on the computer. Also press to shut down the computer on certain models.
Return key	
	Press to move the insertion point to the beginning of the next line. In a dialog box, pressing Return is the same as clicking the outlined button.
Shift key	
	Press to produce capital letters (or the upper character on the key).
Tab key	
	Press to move the insertion point to the next stopping place (such as a tab stop or field in a dialog box or program).

Note: There are two styles of keyboards. Both are shown in this table.

Typing special characters and symbols

You can type a variety of international and other special symbols and characters (including characters with diacritical marks, such as accents) by pressing combinations of keys.

The Key Caps program, which is installed with your system software, shows you the characters produced when you type certain keys and key combinations in the fonts available on your computer. Choose Key Caps from the Apple (🍎) menu, then choose the font from the Key Caps menu.

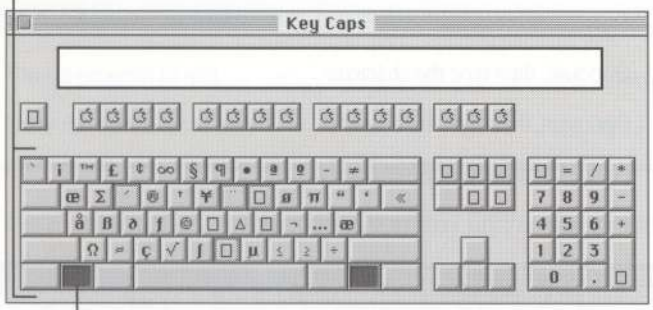


Characters appear here when you press keys on the keyboard or click them in the window.

Characters available in the Chicago font

To have Key Caps show more options for special characters, press each of these keys or key combinations: Option, Shift, Shift-Option, Shift-⌘, and Option-⌘.

Characters available in the Chicago font when the Option key is pressed



The highlighted key represents the key held down on the keyboard—in this case, the Option key.

If you press the Option key, Key Caps outlines lightly the keys that you can use in combination with letter keys to type letters with accents or other diacritical marks.

Note: If you see rectangles instead of diacritical marks on some of the pictures of keys in Key Caps, try pressing Option-⌘ to see the diacritical marks. However, use the Option key (not Option-⌘) in combination with the other keys to type letters with diacritical marks.

If you press the Option key at the same time as a key for a specific diacritical mark and then release both keys, Key Caps outlines in bold the keys for letters that can be typed with that mark. (You'll see that most key combinations for diacritical marks can be used with the Space bar as well as letter keys—producing the mark without a letter.)

The most common diacritical marks and how to create them are summarized next.

Diacritical mark	Key combination
Grave accent (`)	Option–`, then type the character
Acute accent (´)	Option–e, then type the character
Circumflex (^)	Option–i, then type the character
Tilde (~)	Option–n, then type the character
Umlaut (¨)	Option–u, then type the character
The letter "c" with a cedilla (ç)	Option–c

To type a letter or a space with a specific diacritical mark, press the Option key and the key for the mark simultaneously. Then type the letter that needs the mark.

If you are having trouble getting a mark and letter to appear together, try again. Be sure to press the Option key before (or at the same time as) the key for the mark; then, after you release both keys, type the letter to be marked.

Special key combinations

If difficulties with your trackpad or computer don't allow you to use standard methods of quitting a program or restarting your computer, you can try using these special key combinations.

To do this ...	... press this key combination
Force a program to quit	⌘-Option-Esc
Force the computer to restart	⌘-Control–Power key

Here are other key combinations you may find useful to use while starting up your computer.

To do the following at startup...	... press this key or key combination
Start up the computer from a CD-ROM disc	C key and the Power key
Bypass the internal hard disk and start up the computer from a System Folder on another drive	⌘-Option-Shift-Delete and the Power key
Turn off system extensions	Shift key and the Power key
Start the Extensions Manager	Space bar and the Power key

Appendix C

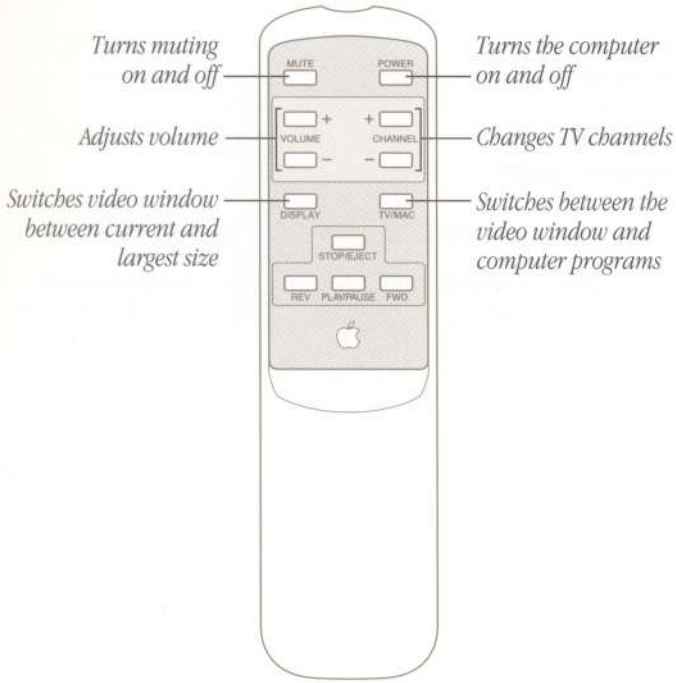
Using the Remote Control

Before using the remote control, install the batteries that are included in your package.

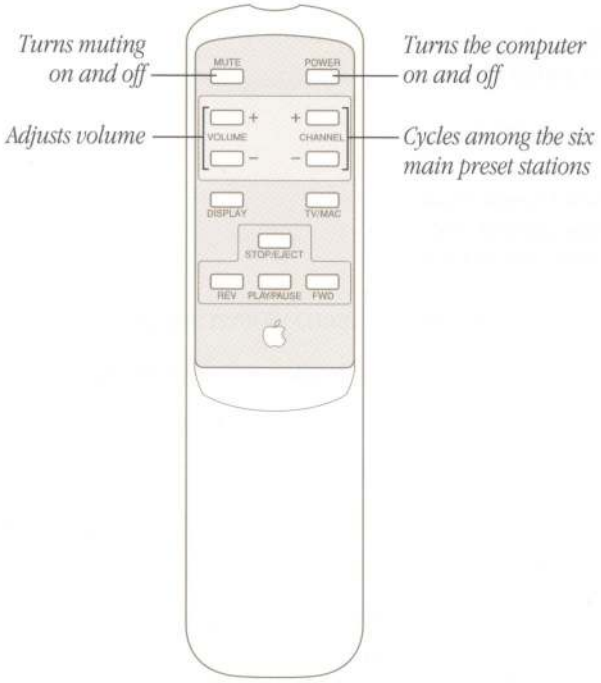
You can use the remote control to

- turn the computer on and off
- switch easily between watching TV or video, and using other application programs
- control the sound of the radio or TV
- change TV channels or radio stations
- manipulate the size of the video window
- control the sound from an audio CD
- stop and eject a CD
- pause and continue play of an audio CD
- move to the next or previous track of an audio CD

Controlling TV or video



Controlling the FM radio

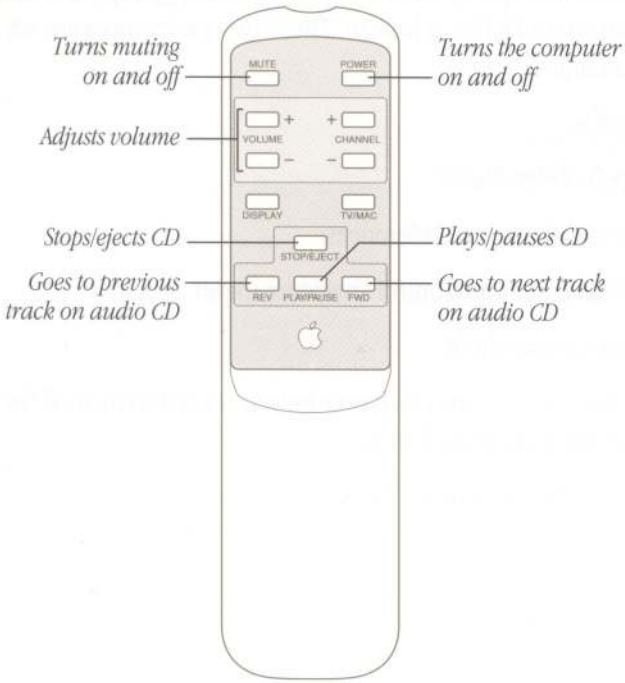


While you hear the radio (whether or not the Apple FM Radio window is open), the remote controls for FM radio work. (You can't use the remote control to switch to the Apple FM Radio from another application program.)

When you press the TV/Mac button while the radio is playing, Apple Video Player starts, but you won't hear the TV or video until you quit Apple FM Radio.

If you are playing an audio CD, you hear the audio CD and the TV or FM radio sounds simultaneously.

Controlling the CD-ROM drive



You use the remote control to control audio CDs in conjunction with the AppleCD Audio Player, available in the Apple (🍎) menu.

Setting preferences for the remote control

You can temporarily turn off the remote control or specify whether a confirmation box appears when the computer is turned off from the remote control's Power button. These two preferences are set using the Apple Video Player application program.

To adjust these preferences, follow these steps:

1. Open the Apple (🍎) menu and choose Apple Video Player.
2. Open the Setup menu in Apple Video Player, and choose Preferences.
3. To turn off the remote control, click the Disable Remote Control checkbox to put an X in it.

   To turn the remote control back on, click to remove the X.
4. To make a confirmation box appear when the remote control's Power button is used to turn off the computer, click the Confirm Power Off checkbox to put an X in it.

   If you don't want to see the confirmation box, click to remove the X.
5. Click OK.

   The changes take effect immediately.

Appendix D

Technical Information

Main unit

Processor

A PowerPC™ 603e processor with the following features:

- Processor speed: 250 megahertz (MHz)
- Built-in floating point unit (FPU)
- 50 MHz system bus
- 32 kilobytes (K) internal cache (16K data, 16K instructions)

Memory

The following come with your computer:

- 32 megabytes (MB) of dynamic random-access memory (DRAM) installed in either a single 32 MB Dual Inline Memory Module (DIMM) or two 16 MB DIMMs

  Each DIMM slot can accommodate a DIMM of up to 64 MB, for a maximum of 128 MB. DRAM DIMMs installed later should be 64-bit wide, 5 volt (V), 168-pin extended data output (EDO) or fast-paged mode DIMMs, with 60-nanosecond (ns) RAM access time or faster and a 2K refresh count. The Single Inline Memory Modules (SIMMs) from older Macintosh computers are not compatible with your computer and cannot be used. DIMMs that require a 4K refresh count and 3.3 V DIMMs also cannot be used.

- 2 MB of built-in video memory using synchronous graphic RAM (SGRAM)
- 4 MB of read-only memory (ROM)
- 50 MHz High Performance Module (256K level 2 cache)

Internal storage devices

The following storage devices were installed in your computer at the factory:

- Apple SuperDrive 1.4 MB high-density floppy disk drive
- 2 gigabyte (GB) Apple ATA (Advanced Technology Attachment) hard disk drive, also known as an Enhanced Integrated Device Electronics (IDE) hard disk drive
- a custom front-loading CD-ROM drive

CD-ROM drive specifications

Disc diameter

- 120 millimeters (mm) (4.7 inches)
- 80 mm (3.2 inches)

Average access time

- *Audio:* 380 milliseconds (ms) for playing audio CDs
- *Data:* 200 ms

Data capacity

- 656 megabytes (MB), Mode 1
- 748 MB, Mode 2

Maximum playing time

- 74 minutes, 42 seconds

Playback formats supported

- Audio CD
- CD-ROM (Modes 1 and 2)
- CD-ROM XA (Mode 2, Forms 1 and 2)
- CD-I (Mode 2, Forms 1 and 2)
- CD-I (Ready)
- CD-I (Bridge)
- Photo CD (Single session and multisession)
- Video CD
- CD-WO (write once) playback

Laser

- *Type:* Semiconductor GaAlAs laser
- *Wavelength:* 790 ± 25 nanometers
- *Output power:* 0.2 to 0.6 milliwatts
- *Beam divergence:* 55°

Video System

Flat panel display

- 12.1-inch diagonal, 800 x 600 active matrix with backlighting
- Color liquid crystal
- 256 or thousands of colors
- *Color depth:* 6 bits each R, G, B

Video and graphics modes

Your computer has the following video and graphic capabilities built into the logic board:

- ATI 3D RAGE II 64-bit graphics and multimedia accelerator chip
- 2 MB synchronous graphic RAM (SGRAM)
- Hardware acceleration of 2-dimensional (2D) QuickDraw graphics and video—accelerates tasks such as scrolling, text and graphic display, and screen redraw
- Hardware acceleration of video for full-screen, full-motion, TV-quality playback of QuickTime movies—accelerates and improves full-screen display of most QuickTime movies and enhances video capture when used with an optional video input card
- Hardware acceleration of 3-dimensional (3D) QuickDraw 3D rendering—accelerates QuickDraw 3D rendering up to 6 times faster than software-only rendering; provides real-time 3D shaded object manipulation, animation, and virtual world navigation; and enhances the realism of 3D interactive titles and games
- Hardware support for 3D features, including the following:
  - 16-bit Z-buffer for hidden surface removal
  - Six perspectively correct texture mapping functions
  - Video textures and texture lighting
  - Flat and Gouraud shading
  - Alpha blending, transparency, and fog effects
  - Support for QuickDraw 3D Rendering Acceleration Virtual Engine (RAVE)

Graphics modes supported

Your computer can display the graphics modes listed in the following table.

Resolution	Color bit depth*	Vertical scan rate (Hz)	Video input supported?	2D acceleration supported?	3D acceleration supported?
640 x 480	8	60	Yes	Yes	No
	16	60	Yes	Yes	Yes
800 x 600	8	60	Yes	Yes	No
	16	60	Yes	Yes	†

* A color depth of 16 bits can display 32,768 colors; a color depth of 8 bits can display 256 colors.

† Depends on the application window size.

Video input

The built-in video input card lets you view and record video from a video camera, VCR, or other video input equipment. The built-in Apple TV/FM Radio System or Apple TV System lets you record video from broadcast or cable television.

- *Input format:* S-video; composite video through composite video to S-video adapter cable
- *Transmission format:* industry standard NTSC/PAL/SECAM
- *Polarity:* sync negative or sync positive depending on video mode
- *Level:* 0.6 volts peak-to-peak (Vpp) minimum to 1.5 Vpp maximum ("S" chroma level 1.4 Vpp maximum)
- *S-video impedance:* 75 ohms (Ω)
- *DC offset:* ± 0.1 volts (V) maximum

Sound

- 16-bit stereo input and output supporting sample rates of 11.025, 22.05, and 44.1 kilohertz (kHz)
- Built-in Bose sound system including Bose bass unit
- Front panel push-button control for volume level and muting
- Front headphone jack
- Built-in omnidirectional electret type microphone
- Sound input and output ports on back of computer

Input level to sound input port

Note: The information in this section applies to the sound input port in the lower rear area of the computer's back panel, not to the video audio input port next to the S-video port in the area covered by the port cover plate.

The sound input port (marked with the 🎙 icon) has two external sound input modes: low level and high level.

To select low or high level, open the Monitors & Sound control panel, click the Sound button, and choose External Microphone (for low level) or Line Level Input (for high level) in the Sound Output pop-up menu.

Recording levels for various input sources

Monitors and sound input source selection	Plug type	Level
External microphone	3-cond	13 mVrms
External microphone	4-cond	250 mVrms
Line level input	3-cond	250 mVrms

Sound input port input impedance

- > 3.5 kilohms (kΩ) nominal, each channel

Input level to video audio input port

Note: The information in this section applies to the video audio input port next to the S-video port in the area covered by the port cover plate.

The video audio input port (marked with the icon, next to the S-video port marked with the icon) has one external sound input mode.

To select the video audio input port for sound input, open the Monitors & Sound control panel, click the Sound button, and choose TV/CD/Video in the Sound Output pop-up menu. Then open Apple Video Player, make sure that the Controls window is open, and click the S-Video button in the Video Source section. Set the volume slider in the S-video window to maximum volume.

- Video audio input connector line level for full-scale output level, with the S-video window's volume slider set at maximum in Apple Video Player: 0.1 Vrms
- Video audio input connector line level for full-scale recording level, with the S-video window's volume slider set at maximum in Apple Video Player: 90 mVrms
- Video audio input connector input impedance: 10 kΩ nominal, each channel

Voltage and impedance for sound output ports

- Front sound output connector output impedance: 32 Ω nominal, each channel
- Front sound output full-scale open circuit output voltage: 1 Vrms
- Rear sound output connector output impedance: 32 Ω nominal, each channel
- Rear sound output full-scale open circuit output voltage: 1 Vrms

Signal-to-noise ratio (SNR) and frequency response

- *SNR:* 75 decibels (dB) minimum, 80 dB typical (A-weighted, 2 Vpp output, 1 kHz, digital record and playback, sound input port to sound output port)
- *Frequency response:* 20 Hz–18 kHz (–3 dB relative to 1 kHz under the same conditions as the SNR measurement)

Clock/calendar

- CMOS custom circuitry with long-life battery

▲ **Warning** If the clock begins to keep time inaccurately, have an Apple-authorized dealer or service provider replace the battery. The service provider will dispose of the battery according to the local environmental guidelines. Do not attempt to replace the clock battery yourself. ▲

Keyboard

- Twentieth Anniversary Macintosh custom keyboard
- Two ADB connectors; one for the trackpad and one for adding a second device if desired

Trackpad

- Solid-state keyboard-mounted trackpad (ADB device); can be removed and repositioned

Interfaces

- Apple Desktop Bus (ADB) port supporting up to three ADB input devices (such as a trackball, keyboard, or mouse) daisy-chained through a serial bus; additional ADB port on back of keyboard
- One internal expansion slot supporting 6.88-inch 15-watt PCI (peripheral component interconnect) expansion cards. Install only expansion cards that come with Macintosh drivers and are compliant with the PCI 2.0 standard. NuBus™ cards cannot be used in this expansion slot.
- One internal expansion slot (comm slot II), supporting communication cards, such as an internal modem or Ethernet card
- One internal video expansion slot supporting a video input card using the NTSC, PAL, and SECAM formats (The video input card is already installed in this slot.)
- One TV tuner card that allows you to connect your computer to an external TV antenna or cable TV service and FM radio antenna (The Apple TV/FM Radio System card is already installed.)
- Two RS-232/RS-422 serial GeoPort-compatible ports for printers, modems, LocalTalk network, or other serial devices

- One external standard SCSI port for storage devices, scanners, printers, and other SCSI devices; supports up to six external devices
- One 3.5-mm sound output port for line-level devices, such as powered loudspeakers, on the back of the computer
- One 3.5-mm headphone jack on the front of the computer
- One 3.5-mm sound input port for stereo sound input
- One 3.5-mm sound input port for stereo sound related to video recording

  The two sound input ports support a standard stereo (miniplug-to-RCA) cable adapter for connecting stereo equipment to your computer. They do not support the Apple Omni microphone (the round microphone shipped with some earlier models of Macintosh) or the attenuated RCA adapter provided with some models of Macintosh.

  Note: Equipment attached to the sound input ports must generate line level output.
- S-video input port for VCR, camcorder, or other video input device; adapter for composite video input devices; supports NTSC, PAL, and SECAM video standards
- F-type connector for TV cable or antenna
- Connector for FM antenna
- Front panel buttons for volume and brightness
- Support for infrared remote control of audio CDs, and for muting sound, setting volume, changing TV or FM channels, adjusting the video window, and turning the computer on and off

Environment

- *Operating temperature:* 10° C to 35° C (50° F to 95° F)
- *Storage temperature:* –40° C to 47° C (–40° F to 116.6° F)
- *Relative humidity:* 5% to 95% noncondensing
- *Altitude:* Works below 3048 m (10,000 ft.)

Size and weight

Weight	Height	Width	Depth
Main unit			
6.8 kg 14.9 lbs.	43.8 cm 17.25 in.	41.9 cm 16.5 in.	25.4 cm 10.0 in.
Bass unit			
4.8 kg 10.5 lbs.	27 cm 10.63 in.	21.1 cm 8.31 in.	29.8 cm 11.75 in.
Keyboard			
.84 kg 1.86 lbs.	2.5 cm 1 in.	29.2 cm 11.5 in.	20.7 cm 8.13 in.

Power

AC line input

- *Line voltage:* 90–130 volts (V) or 180–264 V alternating current (AC), RMS single phase. The computer's voltage is configured manually using a control on the bass unit; this control is pre-set at the factory.
- *Frequency:* 47–63 Hz
- *Power consumption:* 140 watts (W) maximum continuous input power. Typical AC power is 47 W for a 250 MHz computer with a 603e processor, 2 gigabyte (GB) hard disk, 28.8K bits per second (bps) modem, High Performance L2 Module, and a CD-ROM drive installed.

DC power

Maximum continuous output: 70 watts (W)

Current type (V)	Maximum current (A)*
+5	8.5†
+5 (trickle)	0.1
+3.3	5†
+12	2.3
–12	0.25

* Total power output cannot exceed 98 W.

† Not more than 10.7 A total combined current on +5 V and +3.3 V outputs.

Sleep mode

The AC power usage for a computer without PCI cards installed is less than 30 W in sleep mode.

CD-ROM drive

The following table shows typical power consumption for the internal CD-ROM drive.

Power consumption (typical)	
+5 V DC	350 milliamperes (mA)
+12 V DC	500 mA

Power requirements for devices you can connect

Apple Desktop Bus (ADB)

- Trackpad draws up to 10 mA
- Keyboard draws 25–80 mA (varies with keyboard model used)
- Maximum current available for all ADB devices and all serial devices: 500 mA

Note: The ADB port can support up to three daisy-chained ADB devices.

Audio and telecommunications devices

The following table shows power allowances for external devices connected to input ports.

Device	Voltage	Current	Power
Microphone	+5 V	1 mA	5 mW
GeoPort Telecom Adapter & ADB devices	+5 V	500 mA	2.5 W
S-video input connector	+12 V	250 mA	3 W

Expansion cards

Your computer can accommodate only 6.88-inch PCI expansion cards. If you add an expansion card to your computer, make sure the component's power requirements don't exceed the maximum power allowances allocated to it by the computer. Power allowances are presented in the following table.

Device	Voltage	Current	Power
PCI expansion cards (15 watts)*	+3.3 V	2 A	6.6 W
	+5 V	3 A	15 W
	–12 V	500 mA	6 W
Communication expansion card†	+5 V	500 mA	2.5 W
	+12 V	100 mA	1.2 W

* Each PCI expansion card should not consume more than 15 watts of power total.

† The communication card should not consume more than 2.5 watts of power total.

Express Modem specifications

AT command set

- Extended Hayes AT command set

Data Communications Standards

- 33600, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 2400, 4800 bps: ITU V.34
- 14400, 12000, 9600, 7200, 4800 bps: ITU V.32 bis
- 9600, 4800 bps: ITU V.32
- 2400 bps: ITU V.22 bis
- 1200 bps: Bell 212A, ITU V.22
- 1200/75 bps: ITU V.23
- 75/1200 bps: ITU V.23
- 300 bps: ITU V.21
- 300 bps: Bell 103

Group 3 Fax Communication Standards

- 2400, 4800 bps: ITU V.27 ter
- 7200, 9600 bps: ITU V.29
- 12000, 14400 bps: ITU V.17

Error control

- ITU V.42
- MNP Classes 2–4
- Fax Error Correction Mode (ECM): ITU T.30

Data compression

- ITU V.42 bis (up to 4:1 compression)
- MNP Class 5 (up to 2:1 compression)

Dialing capability

- Tone/pulse dialing
- Auto or manual dialing and answering

Data transmission and format

- Full or half duplex operation
- Asynchronous or framed modes
- Character formats:
  - 5, 6, 7, 8, data bits
  - 1 or 2 stop bits
  - Odd, even, or no parity

Memory requirements

- The Express Modem software uses approximately 600K of system memory (DRAM) when the modem is turned on.

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